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ABSTRACT

The goal of this project was to develop a sequential program for the development of critical thinking skills that could be extended to all the elementary schools in the school district. The major objectives were: (1) to enhance teachers' ability to think critically, practice in their classrooms teaching strategies to develop pupils' thinking, and develop and implement a critical thinking program; and (2) to develop overt manifestations of critical thinking in pupils attending classes taught by teachers trained in the use of critical thinking and to help students score higher on tests measuring critical thinking skills than children in a comparison class where these skills were not stressed. The teachers of grades K-5 in the project school, the principal, and the staff development teacher received inservice training in procedures for developing children's thinking skills. The procedures included: the Hilda Taba Teaching Strategies program, the Building and Applying Strategies for Initial Cognitive Skills program, the teaching of critical reading skills, analyzing levels of thinking, and organizing for instruction. An analysis of evaluation data indicated that the children in the project school tended to make greater gains than the children in the comparison school. The teachers also asked more open questions and there was more classroom interaction exhibited. (WR)

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PROJECT TERMINATION REPORT

"PROJECT ACT"

(A PROJECT TO ADVANCE CRITICAL THINKING)

ESEA TITLE III PROJECT NO. 45-70-003-3

by

South-Western City School District

3708 South Broadway

Grove City, Ohio 43123

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CS 000 857

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"PROJECT ACT"

(A PROJECT TO ADVANCE CRITICAL THINKING)

PROJECT TERMINATION REPORT

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July 31, 1973

South-Western City School District

3708 South Broadway

Grove City, Ohio 43123

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PART I

Final Basic Data Forms

SUBMIT IN TRIPLICATE

OHIO DEPARTMENT OF EDUCATION

ESEA TITLE III
781 Northwest Boulevard
Columbus, Ohio 43212

BASIC DATA FORM 2

Due Date: August 1 or ninety (90) days following grant termination, whichever occurs first

SECTION A – GENERAL INFORMATION

PROJECT TITLE	PROJECT NUMBER
Project ACT (Advance Critical Thinking)	40-70-003-3

Applicant Agency	Address (complete)
South-Western City Schools	3708 South Broadway Grove City, Ohio 43123 County Franklin

Name of Project Director	Address (complete)	Telephone Number
Chang-Yil Ahn, Ph.D.	2525 Hoover Road Grove City, Ohio 43123	875-2318 Area Code 614

Superintendent	Address (complete)	Telephone Number
Martin L. Stahl, Ph. D.	3708 South Broadway Grove City, Ohio 43123	875-2318 Area Code 614

Signature of Superintendent	Date
Martin Stahl	7/20/73

SECTION B – SCHOOL POPULATION AND PARTICIPATION DATA

Enrollment Data on or Near the Previous October 1		Number of Children: Pre-Kinder-Garten	Kinder-Garten	Grades 1-6	Grades 7-12	Adults	Staff Receiving Inservice Training	Total
1. Total Enrollment of School District(s) Served by Title III Project	Public	60	1145	7618	7748			16,571
	Nonpublic	--	---	457	152			609
2. Total Enrollment of Schools Served by Title III Project	Public	--	90	403	---			493
	Nonpublic	--	---	---	---			---
3. Persons Directly Participating in the Title III Project	Public	--	90	366	---	4	18	474
	Nonpublic		---	---	---		---	---

4. Direct and Indirect Participation of Students, Teachers and Counselors

Type of School	Direct Participation: Teachers Elementary	Teachers Secondary	Counselors Elementary	Counselors Secondary	Indirect Participation: Teachers Elementary	Teachers Secondary	Counselors Elementary	Counselors Secondary	Students Elementary	Students Secondary
Public	28	--	2	--	469	50	5	10	---	---
Nonpublic	--	--	--	--	24	--	--	--	--	---

SECTION C – ETHNIC, TARGET POPULATION, AND RURAL/URBAN PARTICIPATION

PARTICIPANTS REPORTED IN B-3, PREKINDERGARTEN THROUGH ADULT BY ETHNIC GROUPS	Negro American	Indian American	Oriental American	Spanish surnamed American (Mexican, Puerto Rican, Cuban descent)	Caucasian	Other
Number of Participants	1	---	---	---	473	---
Percent of Participants	.2	---	---	---	99.8	---

PARTICIPANTS REPORTED IN B-3, PREKINDERGARTEN THROUGH ADULT BY TARGET POPULATION	Migrants	Disadvantaged	Handicapped	Early Childhood Education	Other–Specify	
					Normal	---
Number of Participants	0	0	15	0	459	---

PARTICIPANTS REPORTED IN B-3, PREKINDERGARTEN THROUGH ADULT BY RURAL/URBAN DISTRIBUTION	Rural		Standard Metropolitan Area		Other Urban	
	Farm	Nonfarm	Low Socioeconomic Area	Other	Low Socioeconomic Area	Other
Percent of Total Number Served	1.6	56.0	0	0	0	42.4

SECTION D – PERSONNEL FOR ADMINISTRATION AND IMPLEMENTATION OF PROJECT

Type of Paid Personnel	Project Staff Paid with Title III Funds				Project Staff Not Paid with Title III Funds and Volunteers			
	Full Time	Part Time		Full Time Equivalent	Full Time	Part Time		Full Time Equivalent
		Half or greater	Less than half			Half or greater	Less than half	
Administration/Supervision	1		2	1.125			1	.09
Teachers								
a. prekindergarten								
b. kindergarten			2	.18				
c. grades 1-6			15	1.35				
d. grades 7-12								
e. other			1	.09				
Subject matter specialists (Artists, scientists, etc. other than regular teachers)		1	3	.77		3		1.5
Technicians (audiovisual, etc.)			1	.09				
Pupil personnel workers (Guidance, counseling, testing, attendance and school social work)								
Health services personnel (Medical, dental, psychiatric)								
Researchers and evaluators	1			1.00				
Planners and developers								
Disseminators (writers, public relation personnel, etc.)							1	.09
Other professionals								
Paraprofessionals (education aides, etc.)			2	.18				
Other nonprofessionals (clerical, pupil transportation food services, etc.)	1		4	1.36				

SECTION E – PERSONS SERVED BY TITLE III PROJECT AND ESTIMATED COST

MAJOR PROGRAMS OR SERVICES	Number of pupils by grade level (public and nonpublic schools)				Number of nonpublic school pupils	Number of adults (exclude staff receiving training and project staff members)	Number of staff who received inservice training	Total estimated cost	PROJECT HAS TERMINATED Indicate per cent of each program or service that is being continued without Federal Funds
	Pre-Kindergarten	Kindergarten	Grades 1-6	Grades 7-12					
A. Direct educative services (Teaching and aiding teaching)									
1. Basic skills									
a. Remedial									
1) English language arts (except reading)									
2) Reading									
3) Cultural									
4) Social sciences/social studies									
5) Natural science and mathematics									
6) Other – specify									
b. Nonremedial (regular) & enrichment									
1) English language arts (except reading)									
2) Reading									
3) Cultural									
(a) Foreign languages (classical & modern)									
(b) Arts (music, theater, etc.)									
4) Social sciences/ social studies									
5) Natural sciences and mathematics									
6) Other – specify Critical Thinking		90	360				18	10100	100
B. Special education									
1. Handicapped									
2. Gifted									
C. Supporting services									
1. General administration									
a. Information dissemination									
b. Other									
2. Instructional administration									
a. School wide direction and management									

A-22

BD 2-3

...4. PROJECT AND ESTIMATED COST (continued)

MAJOR PROGRAMS OR SERVICES	Number of pupils by grade level (public and nonpublic schools)				Number of nonpublic School pupils	Number of adults (exclude staff receiving training and project staff members)	Number of staff who received inservice training	Total estimated cost	PROJECT HAS TERMINATED Indicate per cent of each program or service that is being continued without Federal Funds
	Pre-Kindergarten	Kindergarten	Grades 1-6	Grades 7-12					
b. System wide direction and management									
c. Instructional supervision									
3. Program development									
a. Research & development									
b. Planning									
c. Evaluation						4		40.00	0
d. Demonstration							12	1,600	100
4. Personnel development							18	10,100	
5. School library resources and other instructional material (except equipment)									
a. Audiovisual materials									
b. Books, periodicals and other printed materials (except textbooks)									
6. School library, audiovisual & other media personnel									
7. Pupil services									
a. Guidance and counseling									
b. Testing									
c. School psychological services									
d. Attendance & school social work									
e. Health services									
f. Pupil transportation									
8. Capital outlay									
a. Sites and buildings									
b. Equipment									
1) Audiovisual									
2) Other instructional equipment									
3) Noninstructional equipment									
D. Improving classroom instruction: flexible scheduling, individual instruction, etc.									
E. Community service or participation									

SECTION F - REPLICATION AND INTEREST

According to your best information, list

1. School districts which have replicated to some degree components of the ESEA Title III project reported on this form.

NAME	LOCATION
Rocky River School District	Rocky River, Ohio
Willoughby-Eastlake City School District	Willoughby, Ohio

2. the number of school districts which have visited the ESEA Title III project reported on this form.

   a. Ohio 29

   b. Other states 3

3. the number of requests (correspondence or telephone) received for information and/or materials relating to the ESEA Title III project reported on this form 524.

PART II

Narrative Section

A. SUMMARY

The Project to Advance Critical Thinking (Project ACT)

Project ACT is located in the Highland Park Elementary School of the South-Western City School District, Grove City, Ohio. The ultimate goal was to develop a sequential program for the development of critical thinking skills that could be extended to all the elementary schools in the school district. The major objectives were two-fold--Teacher and Pupil: 1. Through participation in an inservice program emphasizing critical thinking teachers will enhance their ability to think critically, will practice in their classrooms teaching strategies to develop children's thinking, and will develop and implement a critical thinking program in the basic curricular areas of their respective grade levels; 2. Pupils who attend classes taught by teachers trained in the use of strategies to develop children's thinking will be rated higher by a trained observer in overt manifestations of critical thinking, and will score higher on tests judged to measure specific aspects of critical thinking skills than children in the comparison group classes where these skills are not stressed.

The school was centered in a rapidly developing urban, white, middle-class neighborhood that consisted largely of single family dwellings. The occupational status of these families reflected largely blue collar, sales and managerial fields. Approximately 650 children received direct services from the project over the three-year period, but due to a high pupil attrition rate, only 244 children could be included in the evaluation sample.

The teachers of Grades K-5 in the project school, the principal and the staff development teacher received inservice training in procedures for developing children's thinking skills. These procedures included: 1. the Hilda Taba Teaching Strategies program; 2. the BASICS (Building and Applying Strategies for Initial Cognitive Skills) program; 3. the teaching of critical reading skills; 4. analyzing levels of thinking (recall through evaluation) and questioning; and 5. organizing for instruction to make the total learning situation more conducive to the development of thinking skills. A lesson plan bank consisting of lessons in all curricular areas written by the project teachers was developed and utilized by other teachers.

Baseline achievement and intelligence data were secured on the children in both the project school and the comparison school through the use of the Sequential Tests of Educational Progress (Listening, Science, Social Studies), the Cognitive Abilities Test, and the Lorge-Thorndike Intelligence Test. The data revealed that the two schools were comparable in intelligence and achievement, falling into the average range.

Evaluation instruments consisted of the Student Attitude Inventory, the Critical Thinking Measurement Techniques, and the Instrument for Observation of Discussion Behaviors designed to identify overt teacher behaviors judged to develop children's thinking (each locally developed and pending copyright).

An analysis of the evaluation data indicated that the children in the project school tended to make greater gains on all three instruments than the children in the comparison school. The teachers in the project school asked more open questions, acquired more pupil-pupil and pupil-teacher interaction in discussions, and displayed significantly fewer rejecting and telling behaviors than the teachers in the comparison school. On the basis of the data gathered, all the project objectives were judged to have been achieved.

B. CONTEXT DESCRIPTION

The Locale

The Project to Advance Critical Thinking is located in the Highland Park Elementary School, in Grove City, Ohio. It is one of the eighteen elementary schools of the South-Western City School District which includes most of the South-Western part of Franklin County. Grove City, located near Columbus, is a rapidly developing urban area. Recent trends show a population increase of five per cent per year. As evidence of the rapid growth presently occurring, a release from the Mid-Ohio Regional Planning Commission cites that within the next ten years additional housing developments totaling 550 single units and 825 multi units will be completed just within the Highland Park School attendance area. Consistent with this report, the figures indicate that within ten years an additional 381 children should be enrolled in kindergarten through grade five at the Highland Park School. It is important here to note that within Grove City itself, there are four elementary schools other than Highland Park.

The Highland Park Elementary School is situated within a four-year old housing subdivision at the northeast side of Grove City. The cost of the majority of the homes range from approximately $20,000 to $35,000.

Directly adjacent to this addition is a large area consisting of homes whose occupants qualify under House Bill 235, a program of Federal subsidizing. Additional homes in this area are under construction.

Presently a large portion of the children living there attend another school due to the over-population at Highland Park. Actually about five per cent of the Highland Park School population resides in that area. Highland Park also serves children who reside in a country setting west of Grove City. These children constitute approximately fourteen per cent of the total school population. There is a great diversity in this area in terms of home value ranging from approximately $10,000 to $[illegible],000.

For all intents and purposes, 100 per cent of the school population is Caucasian. A variety of income sources is prevalent. However, the majority of the people tend toward the blue-collar classification. A very small percentage receive welfare funds, and the unemployment rate is low. In many cases both parents work and some fathers hold an additional part-time job. Educationally, the majority of the parents have twelve years of schooling, with a few having less and some having additional college credit. Some are college graduates with a few having training beyond the baccalaureate degree.

The School

Highland Park Elementary School is a single floor building constructed along the open classroom concept. The majority of the children in grades one through five are housed in one large room surrounding an open Instructional Materials Center. The kindergarten and one second grade class are housed in self-contained classrooms within the building.

The project population at Highland Park consists of approximately 501 children in grades kindergarten through five. Since the learning disabilities class and the two classes for educable mentally retarded have not been included in the project for evaluation purposes, a total

of 464 children in grades K-5 more accurately numbers the project population (the third project year).

Nineteen full-time staff members including two teachers at Kindergarten; three at first grade; two and one-half each at second, third, fourth, and fifth grades; one teacher of learning disabilities; two teachers of educable mentally retarded; and one full-time principal service the 501 children.

Special services provided for the children at Highland Park include a staff development teacher (half-time), an art teacher (one and one-half days per week), a counselor (one and one-fourth days per week), a vocal music teacher (one and one-half hours per day), an instrumental (strings) music teacher (one-half day per week), a speech and hearing therapist (ten hours per week), a psychologist (one day per week), and a nurse (one day per week). One educational aide serves in the IMC full-time. One additional aide serves full-time in general aide work. Student teachers are utilized each quarter and approximately fifteen volunteer mothers spend at least one-half day per week assisting teachers.

The school population is now beginning to stabilize. However, during the past four years there has been considerable change. Of approximately 360 children enrolled in grades K-5 the first project year (excluding the special education classes), only 140 of the same population remain at the end of the third year. One hundred twenty of these children moved into middle school. The other one hundred were involved in transfers to other schools resulting from family relocations and alterations in school attendance boundaries.

Seven of the teachers who started the project remain at Highland Park while six have assumed other positions. These positions include

staff development teachers and a student teacher coordinator within the school system. One teacher became an elementary principal outside the district, one teacher became a research analyst for the Model Cities program, and one teacher retired.

The building principal became an inservice specialist for the school district as did the original project director. Additional new staff, mainly graduating student teachers, and a new principal were hired to replace them.

The cost of educating the children in the South-Western City School District as computed for the 1971-72 fiscal year was $716 per child. This includes: Fixed Charges - $78; Instruction - $487; Plant and Operation - $83; Transportation - $27; other Current Expenses - $41. Even though this is an increase of 14.9 per cent over the previous year, it was still below the statewide average of $782 per child.

The recent financial history of the school area suggests a positive attitude toward education. Since 1967, the public approved eight levies, four renewals and four for additional funds, and defeated only two levies which were for additional funds. In 1972, the school tax rates for the South-Western City School District was 30.35 mills for operation and 6.05 mills for construction totaling 36.40 mills.

Special Factors

Needs Assessment

Prior to the inception of this project, it was determined that there was a need for an emphasis to be placed upon the development and acquisition of effective thinking skills.

Three of the critical needs for schools identified by the State

Department of Education were: (1) Specifying instructional objectives in measurable terms which will serve as a basis for effective curriculum review and revision; (2) Improving inservice education; and (3) Evaluating performance of professional staff.

The need was also presented in the literature which indicated that even though the goals of school curricula often include the development of critical thinkers, the actual teaching for such thinking rarely occurs; instead the emphasis tends toward the acquisition of facts and skills and ignores the higher levels of thinking skill. The literature further indicated that the skills that form the basis for critical thinking can be taught; [1, 2, 3] that the process involving critical thinking is developmental; [4, 5] and that even the very young child of three and above is capable of critical reasoning.[6]

It was determined through observations of many teachers, and interviews and informal discussions with them that this pattern was generally true for the elementary teaching staff in the South-Western City School District; i.e., the curriculum at the elementary school level was a

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[1]Dwight Arnold, "Testing Ability to Use Data in the 5th and 6th Grades," Educational Research Bulletin (Columbus, The Ohio State University, 1938) pp. 255-259.

[2]Frances H. Ferrell, "An Experiment in the Development of Critical Thinking," American Teacher, 30 (January, 1946) pp. 24-25.

[3]Hilda Taba, Samuel Levine, and Freeman F. Elzey, Thinking in Elementary School Children, U. S. Office of Education, Project No. 1571 (San Francisco: State College, April 1964) p. 207.

[4]Carita A. Chapman, "Methods and Materials for Teaching Critical Reaction to What is Read in Grades Four through Six," Sequential Development of Reading Abilities, Helen M. Robinson, editor (Chicago: University of Chicago Press, 1960) pp. 84-87.

[5]Charlotte Huck and Bernice Ellinger, "Reading Critically," The Grade Teacher, 82 (March, 1965), pp. 101-105.

[6]Jean Piaget, Judgement and Reasoning in the Child, Patterson, (New Jersey: Littlefield, Adams and Company, 1959), 260 p.

"conventional" program which made little provision for specific instruction in critical thinking skills.

A critical reading project conducted by Drs. Martha King, Willavene Wolf, and Charlotte Huck of The Ohio State University was completed in 1964-1966. Two of the writers of the Project ACT proposal were participants in that program which was a two-year study of critical reading abilities of elementary school children. They were able to further validate the need for an emphasis on critical thinking in the South-Western City School District.

It was further determined that the teachers generally had little understanding of thinking skills and procedures for development of such.

The districtwide inservice education program was limited and consisted of a two-day orientation program for new teachers immediately prior to the opening of school with no regular inservice program for other teachers.

As a result of the needs assessment, it was determined that specific provisions should be made to: (1) provide teachers with the knowledge and skills necessary to develop and implement a program in critical thinking; and (2) provide a process whereby teachers would then utilize their knowledge with children.

The development of such a program inferred the following requirements: (1) personnel for implementation; (2) materials for implementation; (3) an inservice education procedure; (4) an evaluation procedure; and (5) ample funding. These items, then, became the general points for consideration in the development of the project.

Historical Background

An ESEA Title III project in the South-Western City School District entitled Interdisciplinary Multi-Facet Reading Project which was culminated in the spring of 1969, was instrumental in the development of a project designed to act upon the identified needs. Near the end of this project, the teachers in the project school, Montery Elementary, began to request assistance in using questioning techniques with children that would encourage them to think at higher levels. The teachers desired information on the development of thinking. Also, the teachers asked for the services of a consultant who could help them develop an understanding of the content and the process of critical reading.

A participant in the Critical Reading Project at The Ohio State University, who was finally one of the writers of the Project to Advance Critical Thinking, served as this consultant. Due to the limited time available, however, it was impossible to provide the type of inservice necessary. So only a sketchy overview was provided.

The proposal to create and implement "Project ACT" (A Project to Advance Critical Thinking) was then submitted for funding on February 3, 1969.

Highland Park Elementary School opened in September of 1969. Three of the staff members who had participated in the Interdisciplinary Multi-Facet Reading Project at Monterey Elementary School transferred to Highland Park. The staff development teacher at Monterey Elementary School also assumed this responsibility at Highland Park.

Therefore, when it was learned that Project ACT had been funded and was to be housed at Highland Park, these three teachers and the staff development teacher were anxious to participate. Other staff members were

given the option of transferring to another school within the district if they chose not to be involved in the project. Applicants for open positions on the staff were informed about the project and given the option of applying for a position in other schools.

This procedure, then, provided a staff with a committment to the project before it was initiated, thus serving to avoid staffing problems which surely might have occurred had the project simply been imposed.

C. PROGRAM EXPLANATION

Scope of the Program

Overall Goals

The overall goals of the Project to Advance Critical Thinking are: 1. to develop for distribution to interested educators and agencies a program for the sequential development of critical thinking skills in grades kindergarten through five; 2. to develop effective methods of dissemination of information about the program through local, state, and national media; 3. to provide for adoption of the program in the other elementary schools of the South-Western City School District as indicated from an analysis of the effectiveness of such a program; and 4. to develop a demonstration program so that interested educators may observe the implementation of a program of critical thinking.

Goals and Objectives for Inservice

The goal for the inservice program for teachers is that through participation in an inservice program emphasizing critical thinking, teachers will enhance their ability to think critically, practice in their classrooms teaching strategies to develop children's thinking, and develop and implement a critical thinking program in the basic curricular areas of their respective grade levels.

The performance objectives for the inservice program are:

The teachers, after completion of their inservice training will: a. effectively apply in their daily teaching activities, strategies to enhance children's critical thinking; b. spend a higher percentage of their classroom time providing activities designed to stimulate critical thinking by their pupils; and c. develop series' of lessons for learning units in the basic curricular areas, designed to stimulate critical thinking by their pupils.

Goals and Objectives for Implementation with Children

The goal for the implementation of a program designed to help the student improve his critical thinking ability is that pupils who attend classes taught by teachers trained in the use of strategies to develop children's thinking will perform better in critical thinking tasks than the pupils in the comparison group.

The performance objectives for the implementation of critical thinking strategies with children are: The pupils attending classes conducted by teachers who use strategies designed to develop children's thinking skills will, by the end of the project, a. be rated higher by a trained observer in overt manifestations of critical thinking than pupils in classes where these skills are not stressed; and b. show a greater improvement on tests judged to measure specific aspects of critical thinking skills than pupils in the comparison group.

Approximately 650 children in grades kindergarten through five in one public school were served by the project over the three-year period. These children were identified as having average mean I.Q. scores. They were white and came largely from a middle class neighborhood with single family dwellings in a rapidly developing urban community.

The total number of teachers of grades kindergarten through five (excluding special education) at Highland Park over the three-year project period was nineteen. Their mean years of experience at the time they assumed a position in the project school was approximately four years ranging from seven with no previous experience to one with twenty years. All were certificated and several were regularly enrolled for additional college credit.

Personnel

The Project to Advance Critical Thinking required a minimum number of additional personnel.

Project Supervisor

A twelve-month full-time Project Supervisor coordinated the project and guided day by day execution of all project plans. He worked closely with the Administrative Director in the school district, the project curriculum leader, the project evaluator, project consultants, and the building principal. He assumed major responsibilities for the in-service program, taking special training himself and then conducting the majority of the in-service sessions. The Project Supervisor had an M. A. degree in Counseling and Guidance and was certified in School Psychology.

Curriculum Leader

An eleven-month half-time curriculum leader was primarily responsible for working directly with the teachers in developing goals, behaviorally stated objectives, and appropriate lesson plans utilizing the techniques learned for developing thinking skills. Helping teachers select appropriate materials for lessons was also her responsibility. The curriculum

leader assisted teachers in evaluating their lessons and improving them. She was responsible for the on-going day-to-day in-service of teachers. The curriculum leader had an M. A. degree in Elementary Education. She had taught grades one through five and had worked as a curriculum leader for three years in another ESEA Title III project. The other half-time job which she held was that of staff development teacher at Highland Park. The two jobs meshed well since staff development involved working with teachers in curriculum development and professional growth.

Evaluator-Guide

An eleven-month full-time evaluator-guide was experienced in educational research and project planning. He had an M. A. in Psychology, an M. S. in Guidance and received his Ph.D. in Education in 1971. He guided the selection and development of suitable instruments of evaluation for measuring the attainment of project objectives. He arranged for the administration of tests and processed and interpreted the data collected. The evaluator-guide worked closely with the supervisor, the curriculum leader and consultants on matters of evaluation procedures and interpretation of data.

University Consultants

The university consultant served on a part-time basis. She had a Ph.D. degree in Elementary Education with an emphasis in reading and language arts. She had special competencies in critical reading and critical thinking. She served as a consultant to the project staff, especially to the curriculum leader. She also became directly involved in the inservice education program conducting some sessions herself and providing consultants for other sessions. Finally she assisted the project

staff by spending three days observing the teachers and children and writing a final evaluation report of her observation.

An additional consultant was contracted on a part-time basis to assist in the development of a series of individual tests designed to evaluate the development of specific cognitive skills. She had a Ph.D. in School Psychology and was an assistant professor at The Ohio State University.

Administrative Director

The Administrative Director was already in the employ of the South-Western City School District in that position. He had an M. A. with major emphasis in school administration. He had training and experience in working with Federal Assistance Programs. He was responsible for the overall administration of the project. He assisted in the selection of personnel for the project and the evaluation of their performance. He was also responsible for meeting the outside agencies concerning the project. He worked with the project staff in developing evaluation revisions and budget proposals.

Operation

Even though each job description was specified, in actual operation a modified team approach was the rule; i.e., the project staff shared many of the responsibilities utilizing each individual's strengths. This approach permitted everyone to have a knowledge of all aspects of the project. It was also beneficial when some of the project staff members changed positions before the project ended. The original one-half time evaluator-guide assumed a new position after the end of the first year. A new evaluator-guide was employed from within the school system. After the second year of the project, the supervisor as well as the building principal assumed Inservice Specialist positions within the school district

utilizing many of the skills developed through the project inservice with other teachers in the school system. The replacement of the project supervisor was the most difficult of all the replacements because of only one year remaining. Therefore, a realignment of the responsibilities and jobs of the remaining staff occurred. The evaluator moved into the supervisor's role and the curriculum leader moved into the evaluator's role. Each task to be accomplished was listed and assigned to one of the two remaining staff members. It was discovered that the tasks were far more time consuming than two people could manage. So, an additional half-time person was hired for the year to supplement the staff. She had been one of the teachers from the parochial school who had participated in the inservice program and had some knowledge of the project. She was familiar with the teacher evaluation techniques and required only minimal instruction to be able to complete the extensive task. So all tasks for the final project year were completed utilizing a modified team approach with modified job descriptions.

Procedures

Organizational Details

This document is a report of the full three years of the project conducted at Highland Park Elementary School. The project was structured as indicated by the following outline. Each year was considered to be one phase.

Phase I (1970-71): Teacher Training

1. Teachers will learn the skills of critical thinking through:
    a. formal instruction consisting of group discussions, individual conferences, reporting, readings, demonstrations of methods and techniques;

b. classroom tryouts of teaching strategies and materials acquired through the inservice training as described above; consultant help will be utilized;

c. frequent observations by and consultations with supervisory personnel.

2. Teachers will demonstrate their knowledge of the critical thinking skills they are learning at selected intervals throughout the year by:

a. responding to survey instruments about each teaching strategy;

b. developing and trying out their lesson plans which include behaviorally stated objectives, appropriate teaching strategies and appropriate materials. Selected tryouts of each teaching strategy with children will be recorded on audio-tape and butcher paper for analysis according to pre-determined specifications.

Phase II (1971-72): Pilot Phase

1. Teachers will focus on the systematic application of specific teaching techniques and materials in the classroom; and they will become more proficient in understanding their own critical thinking capabilities and in utilizing, with children, the strategies for teaching critical thinking through:

a. continued inservice in which teachers will receive assistance in formulating and stating behavioral objectives, planning lessons and selecting techniques and materials appropriate for attaining the lesson objectives. The lesson plans will be tried out by the teachers in their classes;

b. consultant presentations concerning the teaching of critical reading.

Phase III (1972-73): Demonstration and Dissemination

1. Teachers will refine and demonstrate materials and techniques. Dissemination will be completed. Among these procedures will be the following:
   a. The plans for project demonstration will be implemented. This includes the use of video taped lessons.
   b. The compilation of teacher-prepared lessons within learning units for developing critical thinking skills and their dissemination to interested educators will be completed.
   c. Interested educators and lay persons will be encouraged through articles, newsletters, and other appropriate media to visit the project school.

Activities

Phase I Implementation (1970-71)

Before a sequential program for teaching children to develop thinking skills could be successfully developed and implemented the teachers had to understand and be able to utilize thinking skills. Also, they had to be able to select and develop appropriate materials and techniques for teaching critical thinking.

The Hilda Taba Teaching Strategies Program published by the Institute for Staff Development in Miami, Florida seemed to meet the goals of the project. So, the project supervisor attended a two-week workshop in August, 1970, designed to prepare "training leaders" to use and instruct others in the use of the Taba Teaching Strategies. The project supervisor attended a second two-week workshop in January, 1971 at which time he completed his training.

Upon his return from the first workshop session in mid-August, the project supervisor made preparation for beginning the training of the teaching staff, the principal, and the staff development teacher.

The major thrust of Phase I was the preparation of the instructional staff for the implementation of a critical thinking oriented instructional program during Phase II. This required a structured and persistent inservice training program. The project supervisor scheduled regular inservice training sessions which were announced ahead of time. The schedule was followed closely with deviations occurring only when emergencies arose. The instructional staff, through arrangements agreed upon prior to beginning the inservice, were reimbursed for the time spent in training beyond their regular workday. Each session was scheduled for a two-hour block on Monday's after school except for the one-week pre-school workshop.

The Inservice Content

1. The Hilda Taba Teaching Strategies Program
    a. Concept Development teaching strategy
    b. Interpretation of Data teaching strategy
    c. Interpretation of Feelings, Attitudes, and Values teaching strategy
    d. Application of Generalizations teaching strategy

The Inservice Sequence of Training

1. Each of the four strategies involved the following sequence of training activities:
    a. Awareness experience and analysis
    b. Introduction to theory
    c. Team planning, tryout, and critique

d. Grade level planning

e. Classroom tryout and analysis

f. Tapescript analysis

g. Evaluation of student's thinking

h. Additional theory and application of strategies in a variety of content areas

The Inservice Schedule and Topics

August 24, 1970 - September 3, 1970

Pre-school workshop consisting of an orientation to the project and introduction of the first teaching strategy, Concept Development, was spaced throughout the time indicated to reduce the intensity of the pace.

September 14, 1970 - October 5, 1970

Continuation of training in the Concept Development teaching strategy

October 12, 1970 - January 11, 1971

Introduction of second teaching strategy, Interpretation of Data

January 18, 1971

Inservice conducted by the staff development teacher on critical thinking

January 25, 1971

Inservice conducted by Dr. Martha King and associate on critical thinking, and mid-year staff survey by evaluator

February 1, 1971 - March 8, 1971

Continuation of training in the Interpretation of Data Strategy

March 15, 1971 - April 26, 1971

Introduction of third teaching strategy, Application of Generalizations,

and continuation of training in the Application of Generalizations Strategy

May 3, 1971 - June 7, 1971

Introduction of fourth teaching strategy, Interpretation of Feelings, Attitudes, and Values; and continuation of training in the Interpretation of Feelings, Attitudes, and Values Strategy

Dissemination Procedures

1. Many of the visitors to the project school received information about the project through presentations made by project staff members. These visitors numbered approximately 101 and represented seven universities and colleges and forty-six different school districts.
2. Principals from within the school district requested information about the project. The project supervisor presented the project to the staffs of several of the schools.
3. A presentation by the project supervisor was made at the Superintendent's Cabinet Meeting.
4. Separate presentations were given first to the middle school staff development teachers and second to the elementary school staff development teachers within the South-Western City School District.

Phase II Implementation (1971-72)

Consistent with the goals and objectives of Phase II, a variety of inservice activities were accomplished.

The Inservice Schedule and Topics

August 24 - 31, 1971

Pre-school workshop consisting of refinement and extension of the Hilda Taba Teaching Strategies Program, and critical reading skills and their relationship to thinking skill development

September 1, 1971 - June 17, 1972

A variety of inservice sessions were held for teachers dealing with critical reading, critical thinking, evaluating pupil progress, stating objectives behaviorally, thinking and mathematics, informal education, questioning techniques for literary analysis, and assessment techniques. Consultants were beneficial in presenting these topics.

Extending the use of the Taba Teaching Strategies into all curricular areas and developing appropriate lesson plans provided the emphasis for inservice with the curriculum leader. She was available to assist teachers most anytime they needed help in lesson plan development.

March, 1972 - June, 1973

The Institute for Staff Development in Miami, Florida which published the Taba Teaching Strategies Program, developed another program called BASICS (Building and Applying Strategies for Initial Cognitive Skills). It is similar to the Taba Teaching Strategies Program in that it consists of questioning and discussion techniques designed to develop thinking skills. It is different, though, in that it has broken down the discussion techniques into minute foundation thinking skills and presents a procedure for developing them sequentially. BASICS consists of seventeen major cognitive

skills which provide the basis for thought and decision-making. They are observing, recalling, noticing differences, noticing similarities, ordering, grouping, concept labeling, classifying, concept testing, inferring causes, inferring effects, inferring feelings, concluding, generalizing, questioning, anticipating, and making choices. After reviewing the program carefully, it was determined that BASICS could provide the teachers with the additional knowledge they needed to further the development of thinking. So a voluntary program was organized. Eight of the staff requested participation. The project supervisor attended a week-long workshop which prepared him to teach the program. The eight staff members spent one and one-half to two hours weekly in class plus additional time writing and tape-recording lessons for analysis. This in-service began in March, 1972 and continued until the close of school.

Dissemination Procedures

1. A second brochure describing the project was developed. It was distributed to visitors at presentations made about the project, and at conferences.
2. Formal presentations about the project were made to The Western Ohio Education Association, the West Central Homemaking Teachers Spring Inservice Meeting, the Reassembly Conference for Early Childhood Education, the Franklin County Right-to-Read Committee, the Franklin County Right-to-Read Conference, and seminar groups at The Ohio State University. The total number in attendance at all these functions approximated 376 persons.

3. Fifty-five persons representing two universities and eight school districts visited the project school and received an orientation to the project.

Phase III Implementation (1972-73)

The Phase III project structure called for a refirement of materials and techniques designed to develop children's thinking skills as well as dissemination about them.

The Inservice Schedule and Topics

August 21 - 25, 1972

Pre-school workshop in which all new teachers and all returning teachers who had not received it in 1971-72 began BASICS training, and all teachers having prior BASICS training received a refresher course.

September 1, 1972 - June 1, 1973

An individualized approach to inservice was maintained throughout the year. A variety of opportunities for inservice were provided and participation resulted from an individual teacher's recognition of need or simply her desire to be better informed. Among the topics considered by the staff, several of which were seminar sessions, were critical analysis, informal education, fostering cognitive development through children's play, project review and analysis, planning dissemination presentations and improving quality in learning.

Eleven project teachers participated in BASICS training which consisted of two hours per week per teacher in a class setting after school hours. A total of 42 in-class hours were completed per

teacher. Also, at least one hour per week per teacher was required to audio-tape lessons and analyze them according to a specified discussion analysis form.

The curriculum leader worked with teachers individually and occasionally in small groups on lesson plan development and evaluation. Time before and after school hours as well as during the school day was utilized almost daily. The teachers then tried the lessons with children determining lesson strengths and weaknesses and then revised them for improved results. As the teachers became more adept at thinking skill development, they required less direct assistance. Several teachers developed to the point that thinking skill development became a way of thinking and acting (doing). These teachers requested assistance in analyzing their programs and approaches so that they could be altered for more effective use of thinking skill development. Changes teachers made which required assistance were to permit children to think before responding, to ask open questions requiring more than a yes-no or one word response, to ask children for clarification of responses in an attempt to further their thinking and to determine how they were thinking, to ask questions appropriately, to work with small groups so that children have opportunities for expressing their ideas, and to determine the appropriate content form (concrete-representational-symbolic) for use with particular lessons and particular children.

Dissemination Procedures

1. Visitors to the project school received project information from either the building principal, the teachers, the project supervisor,

or the curriculum leader.

2. A newsletter was developed by the project staff and distributed to each staff member in the South-Western City School District (approximately 800 copies).

3. Several presentations about the project were made to a variety of groups including both educators and lay people. The presentations were made by the project supervisor, the curriculum leader, the evaluator, the district inservice specialists, and many of the teachers. The Central Ohio Reading Council, Highland Park Parent Discussion Group, The Ohio Education Association Professional Development Seminar, Madison County educators of Delta Kappa Gamma, Fairfield County Right-to-Read Meeting, Intern Psychologists from Columbus Public Schools, Student teachers at Highland Park were among these groups. A total of approximately 390 persons were in attendance.

4. A monthly report appeared in the South-Western City Schools Board Report.

5. Project progress was reported in the Grove City Record.

6. Lesson plans were distributed to those persons requesting them. Sample plans were distributed at presentations.

7. A series of video-tapes showing the teaching techniques utilized to improve children's thinking were developed, These tapes are available on loan to interested persons. Some requests have been received and some tapes have been used in presentations.

8. A booklet listing all the lesson plans available at Highland Park was compiled and distributed to each school in the school district. Copies are available upon request.

9. A monthly Parent Bulletin contained articles about the project. It was distributed to every family having children at Highland Park.
10. Demonstration lessons showing the techniques for improving children's thinking were provided for visitors on request.

Instructional Equipment and Materials

Materials and equipment essential for the implementation of Project ACT are listed below with a brief statement about their use. A more complete listing of materials and equipment utilized in project development may be found in Appendix A.

The materials and equipment utilized may be categorized as: Administrative; Inservice; Dissemination; Evaluation; and Lesson Plan Development. Particular items may logically fall into more than one category. If so, these items are listed in each pertinent category.

Administrative Materials and Equipment

Administrative materials vary and are important to the functioning of most any project. These include items such as secretarial and office supplies. Since this project required no special administrative equipment and materials, it will not be discussed here.

Dissemination Materials and Equipment

Dissemination materials and equipment include anything that was purchased specifically to implement the dissemination program described in this document. They include brochures and video tapes.

Two brochures described the program and encouraged interested persons to visit the project school and to request information.

The video taping equipment was borrowed from the school district and was used to produce a series of video tapes and one copy to loan to any persons and groups interestdd in learning more about the project. The tapes were also to be utilized for in-school visitations. These tapes are demonstration tapes showing the inservice training techniques as well as the teaching strategies for developing children's thinking that were central to the project. It was necessary to contract services for the editing and reproduction of the copy of these tapes.

Inservice Materials and Equipment

Materials and equipment utilized in the Inservice category included:

Hilda Taba Teaching Strategies Participants' Manuals

Wall Charts showing four rationales

BASICS Participants' Manuals

Cassette Tape Recorders

Cassette Tapes

Professional Library Materials

Magic Markers

Art Kraft Paper

Each teacher learning the Hilda Taba Teaching Strategies program and the BASICS program was provided with the appropriate manual(s) which were utilized at each training session and between sessions. They included sample lesson plans, lesson plan forms, readings, and most all instructional materials necessary for learning the programs. A portion of the inservice program required each teacher to write lesson plans, audio-tape them, analyze them according to an evaluation sheet provided, and then send them to the training leader for evaluation. Thus it was

absolutely necessary for each teacher to have available a tape recorder and a supply of tapes.

The art kraft paper and the magic markers were utilized in the training sessions to record the discussions. Also, as teachers tried out the lessons (Taba) with children, they recorded the discussions on art kraft paper which were later given to the training leader for evaluating the understanding of the teaching strategy.

A professional library of books, periodicals, and tapes were essential to the project in that teachers needed to develop a background of understanding about thinking and the development of thinking skills. They also needed information about approaches to teaching which involved more individualized and small group approaches thus enabling them to utilize most effectively the teaching skills learned. The professional library enabled them to learn on their own time from quality materials provided. A complete list of materials included in the professional library may be found in Appendix A.

Lesson Plan Development Materials and Equipment

Materials and equipment essential for project development included in the category of Lesson Plan Development were diverse. The materials were provided so that teachers could develop lessons conducive to thinking skill development within the realm of each subject area of the curriculum. Among the materials and equipment which proved to be most widely utilized were:

Children's books (See Appendix A for a complete list.)

Magic Markers

Art Kraft Paper (for actual discussion recording)

Peabody Language Development Kit Stimulus Cards

Mathematics Involvement Program

Filmloops (See Appendix A for a complete list.)

S-APA (Science-A Process Approach) Program

Filmstrips

Evaluation Materials and Equipment

Included under the category of Evaluation are listed the variety of materials and equipment utilized for the evaluation of project activities. The major items are listed below:

Calculator

Key Punch Services

Scoring for Sequential Tests of Educational Progress

The STEP Test Materials (Listening, Social Studies, Science)

The Cognitive Abilities Test

Materials for the Critical Thinking Measurement Techniques

Scoring Service for Iowa Tests of Basic Skills

Cassette Tapes

Watson-Glaser Critical Thinking Appraisal

Stop Watch

Drawers with sliding tops for CTMT Grouping Sub-test

Slide Viewer and slides for CTMT Cause-Effect Sub-test

Tape Recorders

Since tests for evaluating specific critical thinking skills for children in grades Kindergarten through five seemed to be unavailable, it was determined that one alternative for the project was to develop its own. Therefore, a consultant was contracted to assist the project staff in the test development. One of the tests resulting has been labeled Critical Thinking Measurement Techniques (CTMT) and consists of a series of five

sub-tests that must be administered individually. The sub-tests include Grouping, Differences, Cause-Effect, Labeling, and Finish the Story. Seven adults were trained to administer these tests to a random sampling of children in both the project school and the comparison school. This test will be published by the South-Western City School District.

A second evaluation instrument developed by the project staff is an attitude inventory labeled Student Attitude Inventory (SAI). It was administered orally to each group of third, fourth, and fifth graders. Each child responds on a test form. This test has been validated and will be published by the South-Western City School District.

A third evaluation instrument developed by the project staff is referred to as Observation of Discussion Behavior. Thirteen discussion behaviors have been identified. A trained observer observed each teacher in class discussion and analyzed the discussion behaviors in terms of the degree to which appropriate questions were asked for extending children's thinking. The observer simply placed a checkmark in the appropriate space whenever she noticed the teacher manifesting any of the identified discussion behaviors. This instrument has been validated and will be published by the South-Western City School District.

For a more complete listing of materials and equipment utilized in the project, refer to Appendix A.

Effect of Project on Cooperating Agencies

During the first two years of the project, time was devoted to establishing communication with agencies that might ultimately assume a cooperative role in the project. The community agencies contacted were:

Federal Programs Committee, 2100 Frank Road, Columbus, Ohio

Highland Park Parent Teacher Association, Grove City, Ohio

Central Ohio Guidance Association, Columbus, Ohio

School Psychologists of Central Ohio, Columbus, Ohio

Franklin County Children's Services Board, 1951 Gantz Road, Grove City, Ohio

Southwest Community Mental Health Center, 3351 North Broadway, Grove City, Ohio

The Federal Programs Committee heard reports concerning the progress of Project ACT. As a result of this reporting, other curriculum leaders, such as the Director of Special Education, and the Director of Vocational Education, became interested and eventually implemented a portion of the inservice program with their teachers.

Project ACT provided the guidelines for the units developed through the Career Education Program in the South-Western City School District.

In summary, most of the schools in the school district are implementing portions of Project ACT into their programs.

Cooperation with the Highland Park Parent Teacher Association was important to the success of the project. Early in the project, the goals, the objectives and anticipated activities were delineated for the PTA. The Association seemed appreciative of the fact that the teachers were putting forth such an effort into improving education for the children. Parent study groups continually requested additional information as the project progressed. They participated in demonstration sessions and finally the last year requested assistance in learning to use some of the questioning techniques themselves. Several of the members also

assisted the project by administering and scoring selected Critical Thinking Measurement Techniques that were administered in a pilot study. This assistance continued into the final year when several members again assisted in the scoring and administration of critical thinking tests. Parents have cooperated time and again by providing transportation for their children so they could participate in demonstration lessons, video taping sessions, and audio-taping sessions after school hours and during the pre-school workshops.

The Southwest Community Mental Health Center began operation in Grove City only during the last project year. The project evaluator and a representative from that agency worked together to understand the goals of each and to attempt to develop a working relationship. The project activities were detailed and the questioning techniques being utilized with the children were described. It is anticipated that plans for future cooperation will result.

Local educational agencies served by the project include:

The Ohio State University, College of Education

The Diocesan Schools of Columbus

Other schools in the South-Western City School District

Budget

The total amount of the approved budget for the full three years of the project was $212,903.00. Of this amount, approximately $170,202 was budgeted for professional and non-professional salaries. This included the full salaries and fixed costs of the project supervisor, the evaluator, and the project secretary; half-time salary and fixed costs of the curriculum leader; part-time salaries of the Administrative Director and the accounting clerk; stipend for the teachers participating in the pre-school workshops;

and an additional $5.00 per hour per teacher for inservice during the school year.

Approximately $23,500.00 was budgeted for contracted services. These included consultants for the inservice program and for evaluation, and consultants from The Institute for Staff Development. Scoring services for the testing instruments, the administration of and key-punch services for the CTMT, the training of adults to administer the CTMT, and the editing of video tapes were aligned in this category. During one project year the teacher inservice, both pre-school and during the year, and dissemination preparation by teachers was contracted.

Approximately $13,500.00 was budgeted for materials and supplies for testing, for lesson plan development, and for inservice.

Approximately $1,780.00 was budgeted for travel and conference fees; $1,000.00 for equipment; and $2,900.00 for other expenses such as telephone service.

The total per pupil cost of the program was approximately $521.82. This figure was arrived at by taking the total amount of budgeted funds and dividing it by the average number of children in attendance over the three-year period in grades K-5 excluding special education. It must be noted here that this per pupil cost is not the per pupil cost for project replication.

Total Federal Support Under ESEA Title III	$212,903.00
Total Federal Support Other Than Under ESEA Title III	--
Total Non-Federal Support	--
Total Project Cost	$212,903.00
Total Evaluation Cost	$ 42,833.81

More detailed budget information can be secured from Mr. William Senft, Administrative Director, South-Western City School District, 3708 S. Broadway, Grove City, Ohio 43123 (Telephone 875-2318).

Project Replication

If a school or school system should consider replication of the project, the major necessities would include a training leader who had received BASICS and/or Hilda Taba Teaching Strategies Program leadership training from the Institute for Staff Development in Miami, Florida, and the manuals for each participant in the local program. It is essential that only one of the programs be selected to begin with and that no one participant be involved in more than one program at a time. The training leader's time could be divided between both programs as long as there are a total of no more than seventy-five participants for a full-time training leader. It is recommended from Project ACT that local participants receive training in BASICS before the Hilda Taba Teaching Strategies Program.

Present costs for the Hilda Taba Teaching Strategies program include:

-- Salary for a full-time training leader (approximate), per leader	$10,000.00
-- Four weeks leadership training at two two-week Leadership Training Conferences conducted by the Institute For Staff Development, per leader	1,295.00
-- Travel expenses and per diem for the training leader (approximate), per leader	400.00
-- Part-time secretarial service for training leader (approximate), per year	500.00
-- Set of training manuals required for each local participant, each set (10 per cent discount on orders for twenty-five or more complete sets)	18.00

-- Art kraft paper, felt pens, cassette tape recorders (one recorder for two teachers), tapes, (approximate), per person	$ 25.00
-- Provision for monetary reimbursement or released time for local participants (approximate), $5.00 per hour per participant x sixty hours	300.00
*Those who have completed the local inservice can attend a one-week conference to become a second-echelon training leader, per person	450.00
*Travel and per diem for second-echelon training leader (approximate), per person	100.00

*Not required for replication unless there are more than seventy-five participants.

Replication costs for seventy teachers and 2100 children (30 children per teacher) for the Taba Teaching Strategies Program is approximately $515.41 per teacher or $17.18 per child. These costs include the items above that are preceded by a dash (--). Costs would be even less if secretarial services and tape recorders are presently available.

Present costs for the BASICS program include:

-- Salary for full-time training leader, (approximate), per leader	10,000.00
-- Two-week leadership training conference and leader's materials, per leader	650.00
-- Participants manuals (one per local participant), per manual	15.00
-- Travel and per diem for the training leader (approximate), per leader	200.00
-- Part-time secretarial assistance (approximate), per year	500.00
-- Cassette tape recorder (one recorder for two participants) and tapes, (approximate), per person	25.00

** -- Compensation for participants (approximate), $5.00 per hour x forty-two hours per participant	$ 210.00
* Those who have completed the local inservice can attend a one-week conference and receive all leader's materials and become a second-echelon training leader, per leader	450.00
* Travel and per diem for training leader	100.00

*Not required for replication unless there are more than seventy-five participants.

**Ten quarter hours of graduate or undergraduate credit are available for both leaders and participants in the BASICS program with the participant paying university fees.

Replication costs for seventy teachers and 2100 children (30 children per teacher) for the BASICS program is approximately $412.14 per teacher or $13.74 per child. These costs include the items above that are preceded by a dash (--). Costs would be even less if secretarial services and tape recorders are presently available. Also, if the participants enrolled for college credit, the costs could be considerably less depending upon the policies of the school system in regard to inservice reimbursement.

If funds are available, a professional library (approximately $981.00 for the one enumerated in Appendix A), consultants ($100.00 per day), and materials for developing lessons (approximately $3,000.00 for the materials listed in Appendix A), would provide additional quality and enrichment to the program.

Not included in replication costs are the costs of project evaluation, project dissemination, project administration, and project lesson plan development as these costs were important to Project ACT development but may not be important to inclusion in a regular school program.

Replication of the project in other schools in the South-Western City School District has taken the following form. This is reported here to give the reader other alternatives for replication.

Three inservice specialists were employed by the school district to train teachers in the use of skills to develop critical thinking. The specialist-pupil ratio is 1 - 6,000 and extends from kindergarten through grade twelve. These specialists plus the director of special education trained the school administrators, the elementary staff development teachers, the middle school curriculum leaders and high school department heads in BASICS. They have also trained volunteer groups of teachers in several schools in BASICS and Taba Teaching Strategies. Requests for training next year have exceeded the amount of time they have available. The training of teachers in BASICS and Taba Teaching Strategies is only a portion of the responsibilities of these three specialists. All inservice, especially the Career Education Program and many curricular matters fall into their realm of responsibility.

The inservice specialists participate in follow-up conferences provided by the Institute for Staff Development in order to maintain their effectiveness and stay abreast of any changes.

It is anticipated that new teachers in the school system for the 1974-75 school year will be required to learn the BASICS techniques. The only new cost to the school district would be for participants manuals and materials, and remuneration to the participants for inservice time.

Another alternative would be to send one person to receive the leadership training who would in turn train the curriculum leaders, staff development teachers and some department heads. They, or representatives

thereof, would then be sent for the one-week laadership training workshop so that they could become second-echelon training leaders. It would then become their responsibility to train the teaching staffs with which they work and any new staff members.

The cost for such an approach would involve primarily the leadership training conference, manuals for the teachers at the local level, and reimbursement in some form to teachers for their inservice time.

D. EVALUATION OF ACTIVITIES AND OUTCOMES

Objectives

Overall Goals

The overall goals of the Project to Advance Critical Thinking were:

1. To develop, for distribution to interested educators and agencies, a program for the sequential development of critical thinking skills in kindergarten through grade five.
2. To develop effective methods of dissemination of information about the program through local, state, and national media.
3. To provide for adoption of the program in the other elementary schools of the South-Western City School District as indicated from an analysis of the effectiveness of such a program.
4. To provide a demonstration program so that interested educators may observe the implementation of a program of critical thinking.

In order to achieve these goals, the project objectives were established in two components of the project: the teacher inservice training and pupil performance. The specific objectives of the two components are stated below.

Inservice Objectives

1. The teachers, after completion of their inservice training will
   a. effectively apply, in their daily teaching activities, strategies to enhance children's critical thinking;

b. spend a higher percentage of their classroom time providing activities designed to stimulate critical thinking by their pupils;

c. develop series' of lessons for learning units in the basic curricular areas designed to stimulate critical thinking by their pupils.

Pupil Performance Objectives

1. The pupils attending classes conducted by teachers who use strategies designed to develop children's thinking skills will, by the end of the project,

   a. be rated higher by a trained observer in overt manifestations of critical thinking than pupils in classes where these skills are not stressed;

   b. show a greater improvement on tests judged to measure specific aspects of critical thinking skills than pupils in the comparison group.

This section of the report will present evaluation of the project's success in achieving the above stated objectives.

Selection of Participants

This project involved one elementary school in the South-Western City School District. With the exception of the special education classes, the entire student body and teaching staff participated in the project. This project school was a newly constructed building in existence only one year prior to the project incorporation, with one large instructional area where most classes are accommodated. This school was chosen as the project school because of its convenience for carrying out the project.

At the beginning of the project, two other elementary schools were selected as comparison schools. These two schools are of traditional

structure with mostly self-contained classrooms. These schools were believed to be representative of the elementary schools of the South-Western City School District. They, also, were believed to be comparable in population to the project school. Due to the many unexpected changes occurring during the second year of the project operation, one of the two comparison schools was no longer comparable and was eliminated as a comparison school at the end of the second project year. The changes will be explained later in this section.

During the three year period of the project, children and teachers in the project school were exposed to a variety of new educational programs and ideas. Among them were the British Infant School concept, Science-A Process Approach program, the district Math program, Scott Foresman Reading Systems, and a Career Education program. Although the basic teaching strategies that were emphasized by the Project ACT could have been utilized in all other programs listed it was necessary for the teachers first to familiarize themselves with the intent and content of each program. Only then could they successfully utilize the project skills effectively with them. Even though time was a tremendous factor here, the implementation of each of the programs listed reflect the Project ACT content.

The project launched with approximately 360 students in kindergarten through grade five and eleven full-time teaching staff (excluding special education classes), one teacher for kindergarten, and two teachers for each grade, one through five. At the end of the first project year, all fifth graders numbering approximately sixty children were moved into the middle school and approximately thirty children from the various grades transferred to other school districts.

The second project year was started with approximately 400 children.

Among these were 270 children from the original population, sixty new kindergarteners, and about seventy new children who were transferred in to the various grade levels. During the second year of the project, more new students were transferred in. Due to the increased enrollment, one new teacher was hired at the beginning of the second semester and another in February.

Before the beginning of the third project year, quite an extensive change had occurred in the project school. Approximately sixty fifth graders moved into the middle school. Owing to the rapid development of the residential area around the project school, the school district restructured the attendance boundary. This resulted in a considerable number of children in the project school being transferred to one of the two comparison schools. For the reason of contamination among subjects, this comparison school was eliminated. Consequently, the third year of the project included only 165 originally participating children, and one comparison school. In addition to these changes within the student population, there had been a change in the teaching staff of the project school. Only seven of the original eleven teachers (excluding special education classes) were participating in the final year of the project. The other four teachers were replaced and more teachers were added to accommodate the increased enrollment. Also, a new building principal was hired.

At the completion of the final project year, only 165 children had been participating in the project for all three years and 244 children had been participating for the last two of the three years of the project. Only these 244 children who had been participating in the project for at least two years are included in the evaluation. For the teaching staff, all fifteen teachers at Highland Park during the final project year

(excluding special education), are included in the evaluation although only seven of them had participated in the project for the full three-year period of operation.

Description of Participants

The Staff

As it was mentioned earlier in this report, the project school, Highland Park Elementary School, is a newly constructed building with a large class area accommodating most of the children. Project ACT was installed in this school at the beginning of the second year the building had been in operation.

When the staffing procedure for Highland Park School was begun, volunteer applicants were requested in recognition of the uniqueness of the building. In other words, a consideration was given to the possibility that some teachers would not want to teach in an open classroom and some would simply not be suited to such a situation. As a result, the teaching staff at Highland Park School consisted of those who had volunteered to teach in this particular building and were willing to make changes in their own mode of operation to be successful.

Nine of the original teaching staff remained to participate in the project when it was initiated at the beginning of the 1970-71 school year. Additional staff members were hired to replace those who had left after their first year of teaching in the new school. These new staff members were informed of the new project which was about to be initiated and were given the option of applying in other schools if they had wished not to be involved in this project.

The teaching staff of the project school involved in the project

the first year included ten female teachers and one male teacher (excluding special education teachers). Due to increased enrollment during the second project year, two new teachers were added to the staff at the beginning of the second semester. As it was stated in the previous section, four teachers and the principal left the project with their new assignments at the end of the second project year. The project school staff included in the evaluation, then, consists of seven female teachers who participated in the project the full three years and seven female teachers who participated in the project only the last year.

The comparison school consists of a rather stable teaching staff. Only four of the original fifteen teachers were replaced. Among the fifteen, three teachers and one building principal are male and eleven are female. One of the comparison school teachers, the staff development teacher, participated in the district inservice program, therefore this teacher and the building principal are not included in the evaluation.

The Pupils

Approximately 464 children in kindergarten through grade five in one elementary school in Grove City, Ohio are the participants. Of the 464 pupil population, however, only the 244 children who participated in the project for the last two years of operation are included in the evaluation. The children in the special education classes are not included in this number. The neighborhood of this project school consists largely of single family dwellings with a white, middle-class population in a rapidly developing suburban community. The occupational status of these families reflects largely blue collar, sales and managerial fields.

The intellectual maturities and performance in the basic subject areas of the pupils in the project school are within the average range.

The project school is operated with the philosophy of open concept education.

The pupil characteristics of the comparison school are quite similar to those of the project school. In other words, children in the comparison school show average performance on the intelligence tests and other tests of basic academic skills. The major differences are that the comparison school is operated with self-contained classrooms and the neighborhood of this school tends to be more permanent.

The baseline data of intellectual maturity and performance on a standardized test were collected throughout the three-year period of the project.

Baseline Data on Intellectual Maturity

The Cognitive Abilities Test (CAT) and the Lorge-Thorndike Intelligence Test (LTIT) were used to measure the level of intellectual maturity of the children in both the project school and the comparison school. Each child was tested at the beginning of each school year for the last three years.

The CAT was administered to the children in kindergarten, first, and second grades and the LTIT was given to the children in the third, fourth and fifth grades.

Table 1 presents the group mean I.Q. scores for each grade tested each year. Although each child who attended school the last three years was tested, only those children who were in the school for the total three-year period are included in this table. Deviation I.Q.'s (DIQ) for the CAT and I.Q.'s for the verbal, non-verbal, and total test of the LTIT are shown in this Table 1. For the grade group, three numbers or a combination of a letter and numbers are used to indicate the grade level

of the children in each group during each of the three school years. For example, 0-K-1 represents the first graders during the third project year (1972-73 school year) who were kindergarteners during the second project year (1971-72 school year) and had not entered school during the first project year (1970-71 school year).

TABLE 1

VARIATION OF MEAN IQ'S OF PROJECT
SCHOOL CHILDREN OVER A THREE-YEAR PERIOD

GRADE GR..	SEX	N	1970-71	1971-72	1972-73	AVERAGE
0-K-1	B	18	Not Enrolled	104.44	113.61	109.02
	G	24		105.87	112.00	108.94
	T	42		105.26	112.69	108.98
K-1-2	B	13	109.38	108.92	106.07	108.12
	G	17	108.88	110.12	102.76	107.25
	T	30	109.10	109.60	104.20	107.63
					V N T	
1-2-3	B	21	109.29	100.48	89.24 98.19 94.00	101.26
	G	20	104.30	100.65	88.70 101.55 95.45	100.13
	T	41	106.85	100.59	89.98 99.83 94.71	100.72
				V N T		
2-3-4	B	18	Not	95.75 105.80 101.10	Not	101.10
	G	20	Tested	89.83 101.89 95.94	Tested	95.94
	T	38		92.95 104.05 98.66		98.66
			V N T		V N T	
3-4-5	B	15	97.20 94.87 96.27	Not	97.93 108.33 103.33	99.58
	G	18	94.06 100.50 97.61	Tested	96.72 108.39 103.83	99.92
	T	33	95.49 97.94 97.00		97.27 108.36 103.61	99.76

It is noted in Table 1 that children in all grades of the project school obtained average I.Q.'s when measured with the CAT or the LTIT. The lowest group mean I.Q., 98.66, was obtained by the group 2-3-4 and the highest group mean I.Q., 108.98, was obtained by group O-K-1. However, the difference between these two mean I.Q.'s is only 10.32, which is within the range of one standard deviation.

The group mean I.Q.'s of the children in the comparison school are shown in Table 2.

In Table 2 it is noted that all of the five groups show average I.Q.'s ranging from a mean I.Q. of 100.78 for the group 3-4-5 to a mean I.Q. of 107.59 for the group O-K-1. The difference between the lowest group mean I.Q. and the highest group mean I.Q. is 6.81, which is within the range of one standard deviation.

Comparing Table 1 and Table 2, it is concluded that all the grade groups of both the project school and the comparison school children obtained average I.Q.'s on the CAT or the LTIT. The average group mean I.Q.'s of all the grade groups of the children in both schools range from 99.76 to 108.98. This difference is within the range of one standard deviation. Therefore, it is concluded, from the comparison of Table 1 and Table 2, that the children who have participated in the project for three years and the children who have attended the comparison school for three years are identical in terms of the level of their intellectual maturity when measured on the CAT or the LTIT.

The individual I.Q. on the CAT and the LTIT of each child in both the project school and the comparison school is listed in Appendix C.

TABLE 2

VARIATION OF MEAN IQ'S OF COMPARISON
SCHOOL CHILDREN OVER A THREE-YEAR PERIOD

GRADE GROUP	SEX	N	1970-71	1971-72	1972-73	AVERAGE
O-K-1	B	19	Not	108.37	107.47	107.92
	G	26	Enrolled	106.15	108.54	107.34
	T	45		107.09	108.09	107.59
K-1-2	B	14	96.00	98.64	99.07	97.90
	G	27	110.22	107.67	105.57	107.85
	T	41	105.37	104.59	103.41	104.46
					V N T	
1-2-3	B	19	107.32	106.31	93.05 96.05 94.84	102.82
	G	21	102.38	102.00	101.71 105.05 103.67	102.68
	T	40	104.73	104.05	97.60 100.78 99.48	102.75
				V N T		
2-3-4	B	19	Not	95.30 103.10 99.40	Not	99.40
	G	19	Tested	106.50 113.00 109.95	Tested	109.95
	T	38		101.17 108.29 104.93		104.93
			V N T		V N T	
3-4-5	B	26	95.08 101.96 98.77	Not	103.73 108.15 106.19	102.23
	G	20	89.05 100.00 94.80	Tested	98.45 108.05 103.45	98.89
	T	46	92.46 101.11 97.04		101.44 108.11 105.00	100.78

Baseline Data on Student Achievement

In order to obtain baseline data on student achievement, Sequential Tests of Educational Progress (STEP) was used. Only three sub-tests--Science, Social Studies and Listening--were administered to selected groups of children in both the project school and the comparison school. During the second project year, the test was given to the fourth graders (group 3-4-5). During the third project year, the fourth (group 2-3-4) and the fifth (group 3-4-5) graders were tested on the STEP. Therefore, group 3-4-5 was tested twice, first at the beginning of the second project year and last, at the end of the third project year.

The comparison of the group mean scores of the two schools is presented in Table 3. The test given in the second project year is labeled as pre-test and the other is labeled as post-test.

TABLE 3

MEAN COMPARISON OF THE SCORES ON THE STEP

GROUP	SCHOOL	SCIENCE		SOCIAL STUDIES		LISTENING	
		PRE	POST	PRE	POST	PRE	POST
3-4-5 (N=52)	Project	245.96	251.77	238.48	248.13	255.62	267.56
	Comparison	245.67	252.71	239.94	248.44	258.37	266.37
2-3-4 (N=38)	Project	--	248.76	--	240.58	--	262.74
	Comparison	--	256.11	--	250.29	--	270.79

It is noted, in Table 3, that the mean scores on the three sub-tests of the STEP obtained by the group 3-4-5 of the project school are almost equal to those obtained by the equivalent group of the comparison school. This result was obtained in both the pre-test and the post-test. The biggest difference between the project group and the comparison group is 2.75 in favor of the comparison group on the Listening pre-test score.

However, the post-test result on the same test shows that the project group obtained 1.19 higher mean score than the comparison group. Neither difference was proven to be statistically significant.

However, group 2-3-4 shows relatively big differences between the children in the project school and those in the comparison school on the mean scores of all three sub-tests. That is, the children in the comparison school obtained higher mean scores on all three areas of testing. The differences range from 7.35 to 9.71. The statistical significance of these differences was tested via 2 x 3 Analysis of Variance (ANOVA).

The summary of the ANOVA is presented in Table 4.

TABLE 4

SUMMARY OF ANOVA ON STEP (GROUP 2-3-4)

SOURCE	SS	df	MS	F
A (Schools)	3992	1	3992.0	40.40**
B (Sub-Tests)	17967	2	8983.5	90.93**
AB	57	2	28.5	
Within Cell	21943	222	98.8	
Total	43959	227		

** Significant at .01 level

In Table 4, it is found that the mean score on the STEP test obtained by the group 2-3-4 of the project school is significantly different (at .01 level) from that obtained by the comparison group. It is also found that the differences among the mean scores on the three subtests are significant at .01 level.

Therefore, it is concluded that group 3-4-5, which consists of the fifth graders during the school year 1972-73, of both the project school and comparison school performed at the same level on the Science, Social

Studies and Listening sub-tests of the STEP. Neither pre-test nor post-test results show any significant difference in performance between the two schools. However, the children in group 2-3-4, which consists of the fourth graders during the school year 1972-73, of the project school obtained significantly lower scores on all three sub-tests of the STEP than the children in the comparison group. When compared among the three areas of sub-tests, children in both schools show the highest score on the Listening sub-test and the lowest score on the Social Studies sub-test.

The scores of each individual child tested on the STEP are listed in Appendix A.

Measuring Changes

To assess to what degree each of the objectives established for teacher inservice training and student performance were accomplished several instruments were developed by the project staff. They are: Observation of Discussion Behavior (ODB); Student Attitude Inventory (SAI); Critical Thinking Measurement Techniques (CTMT); and Monthly Survey on the Project Related Activities (Monthly Survey).

Since there were no standardized instruments available for evaluating the objectives, these locally developed instruments were utilized for the project evaluation. In this section, the purpose of each instrument, the procedures utilized for training the administrators of each instrument, identification of the objectives evaluated by each instrument, and the time table for the administration of the instruments are presented. The complete description of each instrument is included in Appendix B.

For the convenience of presentation, each instrument will be described separately.

Observation of Discussion Behavior

The purpose of this instrument is to allow a trained observer to record specific behaviors of the discussion leader (the teacher) used in stimulating the participants' (children's) thinking process and the amount of leader-participant interaction during a particular discussion period.

The instrument was revised three times after it was initially tried out. The developer trained a member of the project staff to use the instrument. Together they observed and recorded the actual discussion sessions conducted by the project school teachers. They then compared and discussed their observation results to determine the consistency between the two. This practice was continued until the two observers had agreed upon 90 per cent on their observation recording.

The Teacher Inservice Training Objective, 1a (refer to page 39 for objective) and the Student Performance Objective, 1a (refer to page 40 for objective) are evaluated by this observation instrument.

The observation was performed twice for both project school teachers and the comparison school teachers--first during the months of April and May, 1972, and last, during the months of January through May, 1973. The results of the two observations were compared to determine if there were any significant differences between the two.

Student Attitude Inventory

The purpose of developing this instrument was to measure the attitudes of children in grades three, four, and five toward their teacher and school-related tasks.

The inventory was revised and restructured several times before it was finalized. No special training is required to administer this instrument. It is, however, recommended that someone other than the

teacher of the group of children being tested administer the instrument because the children are asked to reveal their attitudes toward their teacher. The school counselor and the project staff administered this instrument for the project evaluation.

The children were given the instrument twice, at the beginning of the 1971-72 school year and at the beginning of the 1972-73 school year in both the project school and the comparison school.

Pupil Performance Objective 1b (refer to page 40) was partly evaluated by this instrument.

Critical Thinking Measurement Techniques (CTMT)

The purpose of this instrument is to measure children's ability to group various objects according to their common attributes, to notice differences between two objects or items, to infer causes and effects of certain incidents, to label three different objects or items by one common name, and to make a conclusion about an unfinished story. Each of these five ability areas is measured by each independent sub-technique of the CTMT. The sub-techniques were named Grouping, Differences, Cause and Effect, Labeling, and Finish the Story.

A consultant from The Ohio State University was contracted to originate this instrument and the project staff further developed and organized the instrument and the scoring system.

Special training was required to administer this instrument. The project staff trained seven adults in the administration and scoring. These trainees were required to read the manual and to practice under the supervision of the project staff.

The instruments were administered to the randomly selected groups of children in both the project school and the comparison school. The

first administration was performed during the months of March and April of 1972 and the second administration was done a year later.

Pupil Performance Objective 1b (refer to page 40) was evaluated by the CTMT.

Monthly Survey on the Project Related Activities (Monthly Survey)

The purpose of the monthly survey was to determine how much time the project school teachers spent in their classroom on the activities designed to stimulate children's thinking skills. The instrument was developed by the project supervisor and used as a tool to assess the monthly progress of the project not as a formal tool for evaluation.

The survey form was completed by each teacher in the project school each month and was turned in to the project director at the end of the month. However, it was not compulsory to fill out the form. A copy of the form is included in Appendix B.

Presenting and Analyzing Data

Observation of Discussion Behavior

The discussion behaviors of the teachers in the project school and the comparison school were observed twice, during the past two years, by the project personnel.

The first series of observation was conducted during the months of April and May, 1972 and the second series was performed a year later. However, each of the two observations involved a different amount of time. That is, the first series of observations involved only 10-20 minutes of discussion time per teacher, while the second series of observations involved a full-day equivalent classroom instruction time per teacher in both the project school and the comparison school. More specifically, the

second series of observations included classroom discussions of all four major subject areas--Language Arts, Science, Mathematics, and Social Studies as taught by each classroom teacher. However, no more than forty-five minutes of one individual teacher was observed in one single day. An attempt was made to observe each teacher working a full day equivalent time in various subject areas during the second observations.

The results of the observation were summarized using percentages. They were compared between the teachers in the project school and the comparison school in the first series of observations and in the second series of observations respectively. The purposes of the second observation were to determine whether there had been any changes in the project school teachers' discussion behaviors caused by their participation in the inservice education program; and to determine whether there were any differences in discussion behaviors shown by the teachers in the project school and in the comparison school.

The percentage comparisons of discussion behaviors of the teachers observed in both schools are shown in Table 5.

TABLE 5

PERCENTAGE COMPARISONS OF DISCUSSION BEHAVIORS

DISCUSSION BEHAVIOR		FIRST-OBSERVATION		SECOND-OBSERVATION	
		PROJECT	COMPARISON	PROJECT	COMPARISON
Fo	L	9.2*	14.7	18.12*	11.04
	P			24.23*	16.95
R	L	10.0*	3.1	3.63	2.95
	P			3.59	2.96
E	L	14.6	14.7	7.93*	13.06
	P			8.20*	16.42
G	L	33.8	32.5	29.68*	27.05
	P			36.02	36.33
Cl	L	7.1*	4.3	12.44	9.83
	P			11.38	12.09
S	L	21.5*	7.3	18.56*	6.13
	P			17.32*	8.30
O	L	6.4*	2.6	7.76	9.13
	P			11.10	10.14
If	L	8.1*	14.5	5.45*	8.04
	P			6.45*	14.58
It	L	10.9*	16.7	3.47*	1.21
	P			5.57*	2.90
A	L	7.5	5.1	8.87*	6.53
	P			10.35*	12.98
Si	L	.3*	1.3	.83	.81
	P			0	0
P	L	61.8*	51.6	57.33*	41.68
	P			62.15	60.99
Rh	L	2.0*	7.3	4.46*	18.38
	P			1.80	2.67
Te	L	1.0*	7.5	6.31*	11.62
	P			0	0
Rj	L	1.4	1.1	.17*	1.27
	P				
C	L	4.5*	15.2	12.94*	31.27
	P			1.80	2.67

*Significant at .05 level[1]

[1]Henry E. Garrett. Statistics in Psychology and Education (New York: Longmans, Green and Co., 1958), pp. 235-236, p. 449.

According to Table 5, it is noted that:

1. When the percentages of each discussion behavior were compared,

a. The project school teachers showed significantly higher percentages of refocusing, clarifying, summarizing, and organizing behaviors than the teachers in the comparison school, while the comparison group displayed significantly higher percentages of focusing, inferring, interpreting, silencing, rhetorical and telling behaviors than their counterparts in the first observation.

b. The project school teachers showed significantly more focusing, supporting, interpreting and applying behaviors than the comparison group, while the teachers in the comparison school revealdd significantly higher percentages of extending, inferring, rhetorical, telling and rejecting behaviors than the project group in the second observation.

c. All other behaviors not mentioned above were displayed equally by both groups of teachers. The differences in the percentages shown between the two groups on these other behaviors, if any, were not significant when they were tested at .05 level.

d. The children in the project school responded at significantly higher percentages to the teacher's questions, utilizing such techniques as focusing, supporting, and interpreting than the children in the comparison school; while the comparison school children responded at significantly higher percentages to the questions employing such techniques as extending, inferring, and applying than their counterparts in the second observation. Students' behaviors were not recorded in the first observation.

2. When the percentages of the three larger categories of discussion methods were compared;

a. The project school teachers utilized significantly higher percentages of data pursuing methods than their counterparts, while, the teachers in the comparison group used more data confirming methods in the first observation;

b. The project school teachers employed significantly higher percentages of data gathering methods and data pursuing methods than the teachers in the comparison school, while the comparison group utilized significantly higher percentages of data confirming methods than their counterparts in the second observation; and

c. No significant difference was found in children's response patterns when they were compared on these three discussion methods.

In order to determine how much interaction was involved between the discussion leader and the participating children, an interaction ratio was calculated between teacher-talk and student-talk in both the project school and the comparison school. Since the observation was conducted in the various subject areas, the teacher-pupil interaction will be compared among the four major subjects. Table 6 presents the comparisons.

TABLE 6

COMPARISON OF TEACHER-PUPIL
INTERACTION BETWEEN THE TWO SCHOOLS

SUBJECT	PROJECT SCHOOL		COMPARISON SCHOOL	
	TEACHER	PUPIL	TEACHER	PUPIL
Language Arts	1.0	1.2	1.0	1.0
Science	1.0	1.4	1.0	1.5
Math	1.0	1.0	1.8	1.0
Social Studies	1.0	1.3	1.0	1.1
Average	1.0	1.2	1.0	1.0

From Table 6, it is noted that, with an exception in the math classes, the project school teachers allowed their children more opportunity to participate in the discussion. The teacher-pupil talk ratio was maintained 1.0 to 1.0 in math classes. The average interaction ratio between teacher talk and pupil responses in all four subjects was found to be 1.0 to 1.2 in favor of pupil responses.

In the comparison school, however, the interaction between the teacher and the participating children is varied from subject to subject. That is, 1.0 to 1.0 ratio was maintained in Language Arts; 1.0 to 1.5 and 1.0 to 1.1 ratios were maintained, in favor of pupil responses, in Science and Social Studies respectively; and 1.8 to 1.0 ratio was shown in Math in favor of teacher talk. The average ratio of all four subjects between teacher and pupil interaction was, however, maintained 1.0 to 1.0.

Summary

The implication of the above analysis of discussion behavior may be summarized as follows:

1. After their participation in the inservice education program, the teachers in the project school encouraged their children to think by exercising a high percentage of such questioning techniques as focusing, supporting, interpreting, and applying rather than refocusing, clarifying, and organizing techniques that they were emphasizing in the earlier stage of the training.
2. After their participation in the inservice education program, the project school teachers avoided such behaviors as asking rhetorical questions, telling their opinions and rejecting children's responses in their discussions.

3. Teachers in the comparison school spent less time gathering and pursuing data and more time in confirming data than did the project school teachers.
4. Children who were taught by the teachers utilizing the techniques to improve thinking skills responded more to the questions asked for purposes of focusing, supporting, and interpreting the data.
5. Children in the comparison school responded more to the questions asked for purposes of extending, inferring, and applying the data.
6. The project school teachers generally did less talking than the children, while the teachers in the comparison school did as much talking as their children, during their classroom discussion.

Tape Analysis of a Classroom Discussion

In August, 1970, before the inservice training was begun, all the teachers in the project school were asked to conduct a discussion on the topic, "Uses of Water," and record it on an audio tape. In May, 1973, during the final month of the project, these teachers were again asked to do the same. The seven staff members who participated in the project consistently throughout the three-year period were asked to conduct the second discussion. The two tapes, then, were analyzed, using the observation instrument developed by the project, and compared.

The purpose of this comparison was to determine whether there had been any changes in teachers' discussion behavior caused by the inservice education program of the project over a three-year period. The result of percentage comparison of each of the thirteen discussion behaviors between the two taped discussions is shown in Table 7.

TABLE 7

PERCENTAGE COMPARISON OF DISCUSSION BEHAVIORS BETWEEN TWO TAPED DISCUSSIONS

BEHAVIOR	PRE		POST	
	TEACHER	PUPIL	TEACHER	PUPIL
Fo	17.54*	38.44*	2.89	27.78
R	1.31	1.88	.36	.20
E	20.16*	26.25*	6.14	4.17
G	39.01*	66.57*	9.39	32.15
Cl	8.64	9.69*	6.14	3.37
S	1.83*	2.19*	45.13	29.36
O	1.05*	2.19*	9.75	14.88
If	1.57	3.44*	0	0
It	.26*	.62*	11.55	10.91
A	4.19*	5.00*	13.72	8.93
Si	0	0	.36	0
P	17.54*	23.13*	86.65	67.45
Rh	21.73*	10.31*	2.17	.40
Te	21.47*	0	1.44	0
Rj	.26	0	.36	0
C	43.46*	10.31*	3.97	.40

*Significant at .05 level

It is noted in Table 7 that

1. Teachers, after their participation in the inservice education program provided by the project for three years,

a. utilized significantly more behaviors as supporting, organizing, interpreting and applying in their discussion.

b. displayed significantly less behaviors as focusing, extending, asking rhetorical questions, and telling in their discussion.

c. When the percentages of the three larger categories of discussion methods were compared, teachers utilized tremendously higher percentages of data pursuing methods and significantly lower percentages of both data

gathering and data confirming methods in the classroom discussion after their inservice training.

2. Pupils showed a similar trend as did their teachers. That is,

a. Children responded at significantly higher percentages to the questions asked by the teacher utilizing supporting, organizing, interpreting, and applying behaviors in the discussion conducted at the end of the project than the beginning of the project.

b. Pupils responded at significantly lower percentages to the questions asked utilizing such behaviors as focusing, extending, clarifying, inferring, and rhetorical in the discussion performed at the end of the project.

c. When the percentages of the three larger categories were compared, the children responded more to the questions utilizing data pursuing methods than the other two methods in the discussion conducted at the end of the project, while it showed opposite trends in the earlier discussion.

3. The ratio between the teacher-talk and pupil-responses changed from 1.2 : 1.0 to 1.0 : 1.8.

Summary

In summary, both the teachers and the children after their participation in the programs and activities provided by the project displayed significantly higher percentages of data pursuing methods and lower percentages of both data gathering and data confirming methods than in the taped discussion performed before their participation in the project.

Interaction between the teacher and pupils in a discussion conducted before and after the three-year project showed a remarkable change. Teachers talked 80 per cent less than their pupils at the end of the project, while they talked 20 per cent more than the pupils before the project.

Student Attitude Toward Their Teacher and School-Related Tasks

Since the major purpose of developing and administering the Student Attitude Inventory was to determine whether the project has influenced pupils' attitudes toward their teacher and school-related tasks over a period of time, only children who participated in both the pre-test and post-test are included in the data presented in this final report. The first data (pre-test) were gathered in September, 1971 and the second data (post-test) were collected during Septermber, 1972.

The group mean for each grade in the project school and the comparison school on both attitudes toward teacher and attitudes toward school-related tasks are compared between pre- and post-tests in Table 8.

TABLE 8. COMPARISON OF GROUP MEANS AND STANDARD DEVIATION ON SAI

			PROJECT SCHOOL						COMPARISON SCHOOL					
			BOY			GIRL			BOY			GIRL		
GRADE GROUP	ATTITUDE	M OR SD	PRE	POST	DIFF	PRE	POST	DIFF	PRE	POST	DIFF	PRE	POST	DIFF
3-4-5	T		(N=28)			(N=27)			(N=30)			(N=25)		
		M	4.57	6.71	2.14	6.63	9.56	2.93	6.56	7.72	1.16	6.86	8.04	1.18
		SD	4.00	3.92	-.08	5.03	3.54	-1.49	5.76	7.10	1.34	5.40	6.18	.78
	S	M	5.18	4.96	-.22	6.85	10.67	3.82	7.06	9.08	2.02	6.96	9.92	2.96
		SD	4.65	4.69	.04	4.61	5.68	1.07	4.80	6.07	1.27	5.80	5.15	-.65
	C	M	4.87	5.84	.97	6.74	10.12	3.38	6.81	8.40	1.59	6.91	8.98	2.07
		SD	4.34	4.32	-.02	4.83	5.05	.22	5.30	6.61	1.31	5.60	5.69	.09
2-3-4	T		(N=19)			(N=26)			(N=22)			(N=22)		
		M	2.79	4.32	1.53	5.92	7.50	1.50	5.91	6.23	.32	8.45	6.55	-1.90
		SD	6.57	7.59	1.02	4.42	4.56	.14	4.58	5.63	1.05	5.32	6.49	1.17
	S	M	3.11	3.79	.68	5.77	10.12	4.35	2.59	5.14	2.55	6.14	10.23	4.09
		SD	5.58	6.89	1.31	4.41	4.78	.37	4.82	5.35	.53	5.28	5.57	.29
	C	M	2.95	4.06	1.11	5.84	8.81	2.97	4.25	5.68	1.43	7.30	8.39	1.09
		SD	6.10	7.25	1.15	4.42	4.67	.25	4.70	5.49	.79	5.52	6.75	1.23
1-2-3	T			(N=33)			(N=28)			(N=26)			(N=26)	
		M	--	3.42	--	--	7.79	--	--	.88	--	--	2.12	--
		SD	--	4.96	--	--	4.52	--	--	5.67	--	--	6.47	--
	S	M	--	2.70	--	--	7.43	--	--	1.58	--	--	4.62	--
		SD	--	5.47	--	--	7.30	--	--	5.72	--	--	4.83	--
	C	M	--	3.06	--	--	7.61	--	--	1.23	--	--	3.27	--
		SD	--	3.23	--	--	5.59	--	--	5.69	--	--	5.71	--

Key to Table 8

Pre: Pre-test given in the Fall, 1971

Post: Post-test given in the Fall, 1972

Diff: Difference between Pre- and Post-test scores

T: Teacher-related task

S: School-related task

C: Composite of the two tasks

N: Number of students

M: Group Mean score

SD: Standard Deviation

3-4-5 Each number indicates the grade level where the children were enrolled in 1970-71, 1971-72, and 1972-73 school years respectively.

In Table 8, the results for the present fifth graders (Group 3-4-5) show that the attitude toward teacher (T) was increased by 2.14 for boys and 2.93 for girls in the project school and 1.16 for boys and 1.18 for girls in the comparison school; and the attitude toward school-related tasks (S) was decreased by .22 for boys and increased by 3.82 for girls in the project school, while it was increased by 2.02 for boys and 2.96 for girls in the comparison school.

The result for the present fourth graders (Group 2-3-4) reveals that the attitude toward teacher was increased by 1.53 for boys and 1.58 for girls in the project school, while it was increased by only .32 for boys and decreased by 1.90 for girls in the comparison school; the attitude toward school-related tasks was increased by .68 for boys and 4.35 for girls in the project school, while it was increased by 2.55 for boys and 4.09 for girls in the comparison school over a period of one year schooling.

The present third graders (Group 1-2-3) were not given the attitude inventory when they were in second grade, and the result cannot be compared over a period of one year. However, the cross comparison of the results between the project group and the comparison group reveals that children in the project school showed a more positive attitude toward both teacher and school-related tasks than the children in the comparison school; that is, the attitude toward teacher is 3.42 for boys and 7.79 for girls in the project school, while.88 for boys and 2.12 for girls in the comparison school; and the attitude toward school-related tasks is 2.70 for boys and 7.43 for girls in the project school, while 1.58 for boys and 4.62 for girls in the comparison school.

In order to determine whether the increased mean scores for each group are different significantly, four way analysis of variance with unequal cell size[2] was conducted for the fifth (Group 3-4-5) and the fourth grade (Group 2-3-4) results. The results are shown in Table 9 and Table 10 respectively.

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[2] B. J. Winer, Statistical Principles in Experimental Design (New York: McGraw-Hill Book Company, 1962), pp. 201-244.

TABLE 9

ANOVA SUMMARY TABLE OF GROUP MEAN DIFFERENCES ON SAI (GROUP 3-4-5)

SOURCE	SS	df	MS	F
A (Attitude)	.56	1	.56	--
B (Year)	895.99	1	895.99	1.93
C (Sex)	653.22	1	653.22	1.41
D (School)	174.94	1	174.94	
AB	5.05	1	5.05	
AC	23.55	1	23.55	
AD	45.98	1	45.98	
BC	117.75	1	117.75	
BD	6.17	1	6.17	
CD	418.84	1	418.84	
ABC	61.12	1	61.12	
ABD	59.43	1	59.43	
ACD	19.62	1	19.62	
BCD	52.71	1	52.71	
ABCD	19.06	1	19.06	
Error	13550.76	448		
TOTAL	16104.75	463		

TABLE 10

ANOVA SUMMARY TABLE OF GROUP MEAN DIFFERENCES ON SAI (GROUP 2-3-4)

SOURCE	SS	df	MS	F
A (Attitude)	8.84	1	8.84	.02
B (Year)	229.23	1	229.23	.65
C (Sex)	944.93	1	944.93	2.66
D (School)	82.52	1	82.52	
AB	135.24	1	135.14	
AC	51.78	1	51.78	
AD	12.63	1	12.63	
BC	11.99	1	11.99	
BD	12.42	1	12.42	
CD	18.94	1	18.94	
ABC	.02	1	.02	
ABD	52.20	1	52.20	
ACD	11.16	1	11.16	
BCD	25.47	1	25.47	
ABCD	71.57	1	71.57	
Error	11170.85	340	32.85	
TOTAL	12839.69	355		

The result of F test does not show a statistical significance of the group mean differences between pre- and post-tests between any pair of variances. However, the general trend in Tables 9 and 10 reveals that children in the project school showed a slightly greater improvement on their attitude scores toward both teacher and school-related tasks. Especially, the fourth graders of the two schools showed a slightly different pattern of attitude change toward their teacher. In other words, children in the project school gained a little, while their counterpart lost a little.

As it was mentioned previously, the third graders' scores on the attitude inventory cannot be compared between pre- and post-test. However, an attempt was made to determine whether the scores obtained by the project group is significantly different from that of the comparison group. A three way Analysis of Variance with unequal cell frequency was used to test the null hypothesis. The result is shown in Table 11.

TABLE 11

ANOVA SUMMARY TABLE OF GROUP MEAN DIFFERENCES ON SAI (GROUP 1-2-3)

SOURCE	SS	df	MS	F
A (Attitude)	3.16	1	3.16	.09
B (Sex)	126.03	1	126.03	3.81*
C (School)	103.78	1	103.78	3.14*
AB	3.27	1	3.27	.09
AC	12.90	1	12.90	.39
BC	16.51	1	16.51	.50
ABC	1.41	1	1.41	
Error (w.cell)	7198.45	218	33.02	
TOTAL	7465.51	225		

* Significant at .10 level

Table 11 reveals that the null hypothesis was rejected at .10 level on two variances: School and Sex. In other words, third grade (Group 1-2-3) children in the project school, especially girls, show more positive attitudes toward teacher and school-related tasks. Although the statistical significance was tested at a lower level than usual, the 90 per cent level is acceptable in this particular case where a small number of cases is involved.

Summary

In summary, the present fifth graders (Group 3-4-5) in both the project and the comparison schools gained in their scores on both attitudes when compared with their scores obtained a year ago. Although the mean differences of gained scores between the project group and the comparison group is not significant, the project school children showed slightly higher gains on both attitudes.

On their attitude toward school-related tasks, the present fourth graders (Group 2-3-4) in both groups showed the same trend as the present fifth graders (Group 3-4-5). However, their attitude toward the teacher reveals that the children in the project group and the boys in the comparison group obtained slightly more positive scores than they did a year ago, while the girls in the comparison school lost 1.90 mean score when compared with their last year's score.

The present third graders' (Group 1-2-3) score reveals that children in the project school possessed more positive attitudes toward both teacher and school-related tasks than did the children in the comparison school. When compared between boys and girls, the girls showed more positive attitudes than boys. The statistical significance of these differences was tested at .10 level.

Critical Thinking Measurement Techniques (CTMT)

Data Gathering

Due to the extensive amount of time required to administer and score the data for the five techniques of the CTMT, the project staff trained a few parents and utilized them for the task. Seven mothers were trained and utilized for the pre-test which was administered in March and April, 1972; four of them administered the post-test in March and April, 1973. Eight hours were devoted to the initial training and four hours were spent in retraining a year later. During the training sessions, each parent was told what the Critical Thinking Measurement Techniques measure, how to ask the child an appropriate question, how to record the child's responses, and how to score the responses. Each participant also administered all five techniques to a child and scored the responses.

In gathering the pre-test data, four test administrators were assigned to the two comparison schools (two to each building) and three were assigned to the project school. The administrators determined the most efficient way to divide the children for testing but were asked to be sure that each child completed the entire test battery. Considering the fatigue effect, not more than two techniques were administered on the same day to any one child.

The post-test data were gathered differently. It involved only one comparison school and used only four parents. In order to reduce the test administrators' bias, if any, all the children to be tested in both the project school and the comparison school were divided equally among the four so that each administrator tested an equal number of children in each grade in each school.

Sampling

On the CTMT pre-test, only the children in the lower three grades were tested. Using the Table of Random Numbers[3], seventy-two children from the project school and seventy-two children from the two comparison schools were drawn to compose the project group and the comparison group respectively. During the data gathering period, one child from the project group's random sample was withdrawn from school; he was not replaced.

On the post-test, fourteen children (seven boys and seven girls) in each grade from one through five in the project school and the same in the comparison school (Stiles Elementary) were tested. In this sample, only those who had been attending either school for at least two years and who had not been tested previously on the CTMT was included. The same children who were tested a year ago were not tested again because not enough of those children were remaining in the schools and thus it was not possible to draw a pure sample group from all five grades.

In order to determine the comparability of the two sample groups in both the project school and the comparison school, the group mean I.Q.'s were computed. Deviation I.Q. (DIQ), measured by the Cognitive Abilities Test (CAT) of the first and second grade children, and total I.Q., measured by the Lorge-Thorndike Intelligence Test (LTIT) of the children in grades three, four, and five were utilized. Table 12 shows the comparisons.

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[3]Allen L. Edwards. Experimental Design in Psychological Research, 3rd ed. (New York: Holt, Rinehart and Winston, Inc. 1968), pp. 390-394.

TABLE 12

COMPARISON OF MEAN I.Q.'S OF
PRE- AND POST-TEST SAMPLE GROUPS

GRADE GROUP	PRE-TEST				POST-TEST			
	PROJECT		COMPARISON		PROJECT		COMPARISON	
	N	MEAN IQ	N	MEAN IQ	N	MEAN IQ	N	MEAN IQ
O-K-1	24	104.04	24	108.46	14	111.86	14	111.43
K-1-2	23	112.35	24	109.75	14	102.57	14	110.86
1-2-3	24	99.54	24	108.29	14	97.14	14	94.15
2-3-4	--	--	--	--	14	101.30	14	105.00
3-4-5	--	--	--	--	14	108.62	14	105.79
TOTAL	71	105.21	72	108.83	70	104.29	70	105.44

As can be seen in Table 12, the project group and comparison group were comparable on I.Q.'s for both the pre-test and the post-test samples.

Results

Since the CTMT consists of five independent sub-tests, the result on each sub-test will be presented separately.

Grouping

A total of seventeen criteria are identified in the Grouping Technique and they are listed below:

Criterion 1: Total number of groups made by the child.

Criterion 2: Total number of objects used in making groups.

Criterion 3: Total number of objects used more than once.

Criterion 4: Average number of items used in making each group.

Criterion 5: Total number of appropriate rationales given.

Criterion 6: Total number of locational groupings.

Criterion 7: Total number of temporal groupings.

Criterion 8: Total number of functional groupings.

Criterion 9: Total number of relational-contextual groupings.

Criterion 10: Total number of descriptive groupings.

Criterion 11: Total number of inferential groupings.

Criterion 12: Total number of categorical groupings.

Criterion 13: Total number of mixed groupings.

Criterion 14: Total number of styles of categorization used.

Criterion 15: Total number of appropriate labels given.

Criterion 16: Flexibility score: Total of Columns 1, 2, 3, 5, 14, 15

Criterion 17: Quality score: = {(number in Column 9) + (number in Column 10 x 2) + (number in Column 11 x 3) + (number in Column 12 x 3)}

The mean scores of both the project and the comparison groups, on each of the above seventeen criteria, were calculated and compared. Since the pre-test result is available for only the primary grades, the results of the primary grades and the intermediate grades will be presented separately in Tables 13 and 14.

TABLE 13

MEAN COMPARISONS OF GROUPING SCORES OF PRIMARY GRADE CHILDREN

GRADE	O-K-1				K-1-2				1-2-3				TOTAL			
GROUP	PROJECT		COMPARISON		PROJECT		COMPARISON		PROJECT		COMPARISON		PROJECT		COMPARISON	
CRITERIA*	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
1	8.17	10.86	12.25	11.00	9.78	15.00	16.50	9.07	13.00	11.21	14.29	8.57	10.32	12.36	14.35	9.55
2	17.71	21.64	20.25	20.57	20.35	25.50	25.92	18.43	23.13	21.57	24.63	20.21	20.39	22.57	23.60	19.74
3	2.33	4.79	5.38	5.57	5.43	11.50	9.63	2.29	8.17	6.57	8.00	3.79	5.31	7.62	7.67	3.88
4	2.28	2.55	2.64	2.59	2.64	3.26	2.39	2.29	2.80	2.69	3.05	3.12	2.57	2.83	2.69	2.67
5	8.08	10.86	11.54	11.00	9.74	15.00	16.79	9.07	12.96	11.21	14.17	8.29	10.27	12.36	14.17	9.45
6	.17	.29	.50	.21	.35	.71	.21	.29	.33	.57	.46	.29	.28	.52	.39	.26
7	0	.07	.25	0	.04	.14	.04	.07	.21	.21	.33	0	.08	.14	.21	.02
8	.33	1.21	.38	.36	.13	.50	1.38	.21	.83	.36	.63	.50	.44	.69	.79	.36
9	.50	1.57	1.13	.57	.52	1.36	1.63	.57	1.38	1.14	1.42	.79	.80	1.36	1.39	.64
10	4.75	5.43	7.13	5.00	5.39	7.36	9.58	3.57	5.83	4.14	5.83	3.07	5.32	5.64	7.51	3.88
11	1.83	.79	1.17	1.50	2.48	2.21	3.29	.93	4.00	1.57	2.88	1.57	2.77	1.52	2.44	1.33
12	.79	2.86	1.92	3.79	1.35	4.07	2.21	3.93	1.71	4.28	3.88	3.07	1.28	3.74	2.67	3.60
13	.21	.21	.21	.14	0	0	.08	.07	.04	.07	.17	.07	.08	.09	.15	.09
14	2.29	2.93	2.50	2.79	2.57	3.36	3.21	2.93	2.71	3.14	3.08	2.64	2.52	3.14	2.93	2.79
15	6.13	10.07	9.54	10.50	9.39	14.21	14.75	8.86	11.50	11.07	12.58	8.21	9.00	11.78	12.29	9.19
16	44.71	61.21	61.46	62.21	57.26	84.57	86.38	50.64	71.46	64.79	76.75	51.71	57.82	70.19	74.86	54.85
17	15.96	23.36	17.50	26.43	22.78	34.93	27.33	22.29	30.17	27.00	30.67	20.86	22.97	28.43	25.17	23.19

*Refer to the preceding page for criterion identification

In Table 13, it is interesting to find that the intermediate grade children in the project school improved their post-test scores on all but one criterion, Criterion 11, over their pre-test scores, while the comparison group received lower scores on all but one criterion, Criterion 12, in the post-test than in the pre-test.

When compared between the project group and the comparison group in each pre- and post-test, the comparison group shows higher scores on all but one criterion, Criterion 11, than the project group in the pre-test, while the project group shows higher scores on all the criteria excluding Criterion 13, which shows an equal score, in the post-test.

Although each of the seventeen categories is important for measuring the children's ability to group things together, the grouping scores may be represented by one criterion, Criterion 16. Criterion 16, termed Flexibility Score, indicates how flexible the child is in utilizing various objects to make different groups.

In this report, only the flexibility scores obtained by each group on the pre-test and the post-test will be analyzed. In Table 13 it was noted that the project group received a pre-test score of 57.82 and a post-test score of 70.19, and the comparison group received a pre-test score of 74.86 and a post-test score of 54.85 on Criterion 16. In other words the project group improved their scores by 12.37 points as shown on the post-test over the pre-test, while the comparison group received 20.01 points lower on the post-test than on the pre-test. At the same time, it can be said that the project group performed 12.37 points lower than the comparison group on the pre-test, but the project group received 15.34 points higher than the comparison group in the post-test. In order to determine whether the differences shown in any of these comparisons are

significant, two-way analysis of variance (ANOVA) was performed. The summary of the ANOVA is presented in Table 14.

TABLE 14

SUMMARY OF ANOVA ON GROUPING FLEXIBILITY SCORE--PRIMARY GRADES

SOURCE	SS	df	MS	F
A (School)	37.89	1	37.89	
B (Pre- or Post)	767.87	1	767.87	
AB	13795.38	1	13795.38	8.59**
Within Cell	368040.23	223	1650.40	

*Significant at .01 level

In Table 14, it is found that there was no significant difference of the mean scores when compared either between the project group and the comparison group or between the pre-test and the post-test. Only the interaction effect of schools and the two testings was found significant at .01 level. That is, children in both the project group and the comparison group performed at the same level on the grouping techniques but the project group improved significantly over a one-year period.

The scores of the intermediate grade children on each of the seventeen criteria of the grouping technique are presented in Table 15.

TABLE 15

MEAN COMPARISONS OF GROUPING
SCORES OF INTERMEDIATE GRADE CHILDREN

GRADE GROUP	2-3-4		3-4-5		TOTAL	
CRITERIA	PROJ.	COMP.	PROJ.	COMP.	PROJ.	COMP.
1	10.50	9.64	11.07	10.21	10.78	9.92
2	23.86	22.07	30.57	26.29	27.12	24.18
3	7.71	6.50	14.00	5.29	10.86	5.90
4	3.73	3.32	4.50	3.36	4.12	3.34
5	10.50	9.64	11.07	10.21	10.78	9.92
6	.64	.64	.71	.50	.68	.57
7	.21	.14	.07	.29	.14	.16
8	.79	.36	.29	.21	.54	.28
9	1.64	1.14	1.07	1.00	1.36	1.07
10	3.36	2.36	4.29	3.86	3.82	3.11
11	2.07	2.50	2.43	1.71	2.25	2.10
12	3.21	3.50	3.14	3.36	3.18	3.43
13	.14	.14	.14	.21	.14	.18
14	3.14	3.07	3.50	2.93	3.32	3.00
15	10.14	9.50	10.93	9.93	10.54	9.72
16	65.86	60.43	81.14	64.86	73.50**	62.64
17	24.29	23.86	26.36	23.93	25.32	23.90

** Significant at .01 level

According to Table 15, the total mean scores of the project group are higher on all but three criteria, Criteria 7, 12 and 13, than those of the comparison group. Criterion 16, the Flexibility Score, shows that the children in the project school received 10.86 points higher than those in the comparison school. The difference was found significant at .01 level by the t test.

In summary, the project school children both in the primary and the intermediate grade groups received significantly higher grouping flexibility scores than did the comparison group on the test given at the end of the project's final year. The primary grades project group gained significantly on the grouping flexibility score, while the comparison group lost significantly over a one-year period of time.

Differences

Group mean scores of the project school children and the comparison school children on the noticing differences technique are compared at each grade level as well as on the total mean score. The pre- and post-test results are also compared for the children in the primary grades, while only the post-test results are compared for the intermediate grades.

Table 16 presents the comparison of scores on the differences technique of the primary grade groups.

TABLE 16

MEAN COMPARISON OF "DIFFERENCES"
SCORES OF PRIMARY GRADE CHILDREN

GRADE	O-K-1		K-1-2		1-2-3		TOTAL	
TESTING	PRE	POST	PRE	POST	PRE	POST	PRE	POST
Project	41.04	56.79	47.26	77.36	62.46	69.14	50.30	67.76
Comparison	62.92	87.14	78.46	72.57	85.08	71.71	75.49	77.14

In Table 16, it can be noted that the comparison group performed better in both the pre- and post-tests than the project group. Only the post-test result of grade group K-1-2 of the project school shows a higher mean score than the comparison school. It is also noted, from Table 16, that the total mean score of the project group was heightened 17.46 points over a period of one year, while the comparison group showed only 1.65 points gain in the post-test over the pre-test.

In order to determine the significance of any of the differences shown in total mean scores of the two groups and the two testing times, Analysis of Variance (ANOVA) was performed. The summary of ANOVA is shown in Table 17.

TABLE 17

SUMMARY OF ANOVA ON
DIFFERENCES SCORE--PRIMARY GRADES

SOURCE	SS	df	MS	F
A (School)	15724.27	1	15724.27	22.69**
B (Pre- or Post)	4804.59	1	4804.59	6.93**
AB	3289.38	1	3289.38	4.74*
Within Cell	154500.47	223	154500.47	

**Significant at .01 level
*Significant at .05 level

According to the result of ANOVA in Table 17, both differences shown between the scores of the project group and the comparison group, and the pre-test and the post-test are significant at .01 level, while the interaction effect is significant at .05 level.

In order to determine which mean score is significantly different, the Newman-Keuls Method[4] was applied. The result was found as follows:

a b c d

where a = pre-test mean of the project group (M = 50.30)

b = post-test mean of the project group (M = 67.76)

c = pre-test mean of the comparison group (M = 75.47)

d = post-test mean of the comparison group (M = 77.14)

that is, the pre-test mean score of the project group children in the primary grades was significantly lower than the other three mean scores on the Noticing Differences technique. This implies that the project school children improved significantly over a one-year period in their skills of noticing differences between two "things," while the comparison group did not improve significantly.

The result of the intermediate grade children on the same technique is presented in Table 18.

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[4]Ibid., pp. 96-104, 648-649

TABLE 18

MEAN COMPARISONS OF "DIFFERENCES" SCORES OF INTERMEDIATE GRADE CHILDREN

	2-3-4	3-4-5	TOTAL
Project	92.21	99.43	99.32
Comparison	121.57	83.21	102.39

In Table 18, it is noted that the fourth grade (Group 2-3-4) children in the project school received 29.36 points lower than the comparison group, while the fifth grade (Group 3-4-5) children in the project school received 16.22 points higher than the comparison group. Although these two differences are significant, the total comparison between the project group and the comparison group shows only 3.07 points difference in favor of the comparison group. The t test result shows that this total difference is not significant.

In summary, the result of the differences technique shows that; (1) the comparison group performed better than the project group in the pre-test; (2) two grade groups (K-1-2 and 3-4-5) of the project school performed better and three grade groups (0-K-1, 1-2-3, and 2-3-4) of the project school performed lower than the comparison groups in the post-test; and (3) the project group showed a significant improvement in their scores on the differences test over a one-year period, while the comparison group improved only slightly.

Cause and Effect

A total of nine slides are included in this technique to measure children's ability to infer causes and effects of a certain incident. Since inferring causes and inferring effects were established as two

independent tasks in this particular technique, the results on the two tasks will be presented separately.

Inferring Causes:-Mean scores of each grade group of the project school and the comparison school on each of the nine slides are compared between the pre-test and the post-test for the primary grade children. The result of the comparisons is shown in Table 19.

In Table 19, it is noted that the project group obtained the lowest total mean score, while the comparison group attained the highest mean score on the pre-test. It is also noted that the project group gained a mean score of 3.11 points, while the comparison group lost 1.19 points over one year. In order to determine whether these gains and losses are statistically significant, ANOVA was performed. The summary of ANOVA is presented in Table 20.

TABLE 19

MEAN COMPARISON OF "CAUSES" SCORES OF THE PRIMARY GRADE CHILDREN

SLIDE	0-K-1				K-1-2				1-2-3				TOTAL			
	PROJ.		COMP.		PROJ.		COMP.		PROJ.		COMP.		PROJ.		COMP.	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
1	1.00	1.64	1.58	1.50	.96	1.64	1.83	1.50	1.17	1.64	1.92	1.57	1.04	1.64	1.78	1.52
2	.96	1.43	1.33	1.50	1.13	1.21	1.88	1.36	1.13	1.57	1.71	1.64	1.07	1.40	1.64	1.50
3	.92	1.50	.96	1.50	1.00	1.00	1.38	1.07	.92	1.21	1.50	1.29	.94	1.24	1.28	1.29
4	1.04	1.29	1.54	1.43	1.00	1.43	1.58	1.57	1.04	1.50	1.71	1.36	1.03	1.41	1.61	1.45
5	.38	.91	.79	1.14	.74	1.00	1.04	.71	.75	1.14	1.21	1.00	.62	1.02	1.01	.95
6	.92	.91	1.17	1.14	.70	1.00	1.33	1.21	.83	1.36	1.38	1.29	.82	1.09	1.29	1.21
7	.63	.71	1.38	1.14	.96	1.14	1.17	.91	1.08	1.29	1.29	1.21	.89	1.05	1.28	1.09
8	.88	1.14	1.33	1.36	.87	1.21	1.63	1.29	.96	1.36	1.58	1.21	.90	1.24	1.51	1.29
9	.63	1.14	.96	1.29	.87	1.00	1.29	.91	.88	1.21	1.42	1.21	.79	1.12	1.22	1.14
TOTAL	7.36	10.67	11.04	12.00	8.22	10.63	13.13	10.53	8.76	12.28	13.72	11.78	8.10	11.21	12.62	11.43

TABLE 20

SUMMARY OF ANOVA ON
"CAUSES" SCORES--PRIMARY GRADES

SOURCE	SS	df	MS	F
A (School)	295.78	1	295.78	26.48**
B (Pre or Post)	48.42	1	48.42	4.33*
AB	242.62	1	242.62	21.72**
Within Cell	2490.67	223	11.17	

**Significant at .01 level
*Significant at .05 level

According to the result found in Table 20, the difference in mean scores between the project group and the comparison is significant at .01 level and the difference in mean scores between the pre-test and the post-test is significant at .05 level. The interaction effect of schools and the two testings is also found significant at .01 level. In order to compare the differences between all pairs of means, the Newman-Keuls Method was applied. The result of the Newman-Keuls test is:

a b d c

where, a = pre-test mean of the project group (M = 8.10)

b = post-test mean of the project group (M = 11.21)

c = pre-test mean of the comparison group (M = 11.02)

d = post-test mean of the comparison group (M = 11.43)

that is, the pre-test mean score of the project group is significantly lower than the other three mean scores. This indicates that the improvement shown on the post-test result of the project group is statistically significant, while the difference shown between the pre-test and the post-test results of the comparison group is not significant.

The result of the intermediate grade children, who were tested at the end of the project, is presented in Table 21.

TABLE 21

MEAN COMPARISONS OF "CAUSES"
SCORES OF INTERMEDIATE GRADE CHILDREN

SLIDE	2-3-4		3-4-5		TOTAL	
	PROJ.	COMP.	PROJ.	COMP.	PROJ.	COMP.
1	1.93	2.00	2.07	1.64	2.00	2.04
2	1.86	1.57	1.86	1.43	1.86	1.50
3	1.57	1.29	1.50	1.07	2.04	1.18
4	1.57	1.57	1.43	1.21	1.50	1.39
5	1.14	1.21	1.21	1.29	1.18	1.25
6	1.50	1.21	1.07	1.07	1.28	1.14
7	1.50	1.43	1.21	1.36	1.36	1.10
8	1.29	1.57	1.43	1.43	1.36	1.50
9	1.21	1.43	1.36	1.21	1.28	1.32
TOTAL	13.57	13.29	13.14	11.71	13.86*	12.72

*Significant at .05 level

In Table 21, it is found that both grade groups, Group 2-3-4 and Group 3-4-5, of the project school obtained higher mean scores on the inferring causes technique. The total difference between the project group and the comparison group is 1.14 points in favor of the project group. The result of the t test was found significant at .05 level. That is, the project group performed significantly better than the comparison group on the technique measuring the ability to infer causes of an incident.

Inferring Effects:-Mean scores obtained, by the children in the primary grades of the project school and the comparison school, on the inferring effects technique are presented in Table 22.

TABLE 22

MEAN COMPARISON OF "EFFECTS" SCORES OF THE PRIMARY GRADE CHILDREN

SLIDE	0-K-1				K-1-2				1-2-3				TOTAL			
	PROJ.		COMP.		PROJ.		COMP.		PROJ.		COMP.		PROJ.		COMP.	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
1	.46	1.21	1.13	1.50	1.00	1.43	1.38	1.21	1.13	1.43	1.54	1.36	.86	1.36	1.35	1.36
2	.88	1.29	1.21	1.36	.96	1.50	1.38	1.36	1.13	1.50	1.63	1.29	.99	1.43	1.47	1.34
3	.67	1.00	1.08	1.14	.74	1.14	1.08	1.14	.88	1.00	1.17	1.07	.76	1.05	1.11	1.12
4	.71	1.00	1.04	1.21	.70	1.14	1.04	1.07	.88	1.29	1.33	1.07	.76	1.14	1.14	1.12
5	.38	.64	.79	1.07	.83	1.14	.83	.91	.79	1.14	1.33	1.07	.67	.97	.98	1.02
6	.71	1.00	1.21	.91	.65	1.14	1.38	1.07	.92	1.14	1.17	1.21	.76	1.09	1.25	1.06
7	.42	.64	.96	1.07	.87	1.07	1.04	.71	.83	1.00	1.17	1.14	.71	.90	1.06	.97
8	.46	.91	.88	.71	.57	.91	1.13	1.07	.75	1.00	1.13	.86	.59	.94	1.05	.88
9	.46	.91	.92	1.29	.87	.91	1.13	1.00	.83	1.07	1.38	.86	.72	.96	1.14	1.05
TOTAL	5.16	8.64	9.22	10.29	7.19	10.43	10.39	9.50	8.14	10.57	11.85	9.93	6.82	9.84	10.47	9.92

In Table 22 it is noted that the pre-test mean of the project group is the lowest and the pre-test mean of the comparison group is the highest. The two post-test means are located between the pre-test means. It is also noted that the project group gained a mean score of 3.02 points, while the comparison group lost a mean score of .55 points on the inferring effects technique over the two testing periods. In order to determine the significance of the differences shown on the four group means, ANOVA was performed. The result of the ANOVA is shown in Table 23.

TABLE 23

SUMMARY OF ANOVA ON
"EFFECTS" SCORES--PRIMARY GRADES

SOURCE	SS	df	MS	F
A (Schools)	183.15	1	183.15	12.71**
B (Pre or Post)	80.52	1	80.53	2.59*
AB	167.89	1	167.89	11.66**
Within Cell	3214.18	223	14.41	

**Significant at .01 level
*Significant at .05 level

According to the result found in Table 23, the difference shown between the mean scores of the project group and the comparison group is significant at .01 level and the difference between the mean scores of the pre-test and the post-test is significant at the .05 level. The interaction effect of the schools and the two testings is also significant at the .01 level. In order to compare the differences between all pairs of means, the Newman-Keuls test was performed and found:

a b d c

where, a = pre-test mean of the project group (M = 6.82)

b = post-test mean of the project group (M = 9.84)

c = pre-test mean of the comparison group (M = 10.47)

d = post-test mean of the comparison group (M = 9.92)

that is, the mean score obtained by the project group in the pre-test is significantly lower than the other three means. This indicates that the project group gained significantly in the post-test, while the comparison group lost slightly (although not significant).

The result of the intermediate grade children on this technique is presented in Table 24.

TABLE 24

MEAN COMPARISON OF "EFFECTS" SCORES
OF THE INTERMEDIATE GRADE CHILDREN

SLIDE	2-3-4		3-4-5		TOTAL	
	PROJ.	COMP.	PROJ.	COMP.	PROJ.	COMP.
1	1.79	1.86	1.79	1.57	1.79	1.72
2	2.07	1.93	1.86	1.79	1.96	1.86
3	1.07	1.57	1.36	1.43	1.22	1.50
4	1.29	1.50	1.29	1.29	1.29	1.40
5	1.36	1.43	1.29	1.00	1.32	1.22
6	1.07	1.14	1.07	1.14	1.07	1.14
7	1.29	1.64	1.07	1.14	1.18	1.39
8	.91	1.36	1.36	1.00	1.14	1.18
9	1.00	1.50	1.14	1.36	1.07	1.43
TOTAL	11.85	13.93	12.23	11.72	12.04	12.83

In Table 24 it is noted that the project group 2-3-4 received 2.08 lower mean score than the comparison group, while the project group 3-4-5 received .51 higher mean score than the comparison group. The total comparison shows that the children at the intermediate grade level in the project school received .79 points lower mean score than their counterparts on the inferring effects technique. However, this difference is not

significant statistically.

In summary, the primary grade children in both the project school and the comparison school were tested twice during the project period on their abilities to infer causes and effects of an incident. The pre-test was given in the Spring of 1972 and the post-test was administered in the Spring of 1973. The results were compared between the two groups and between the two tests. It was found that the project group received lower mean scores in the pre-test but improved significantly on both techniques of inferring causes and inferring effects over a one-year period. Even though the comparison group received higher mean scores than the project group on both techniques, the post-test scores dropped slightly.

The intermediate children were tested only once at the end of the project period, Spring, 1973. The comparison of the result was made between the mean scores of the project group and the comparison group. The findings are that the project group received a significantly higher mean score than the comparison group in the inferring causes technique, but the two groups performed at the same level on the inferring effects technique.

Labeling

The mean scores obtained by children in the primary grades in both the project and comparison schools were compared between pre- and post tests. The result of the comparison is presented in Table 25.

TABLE 25

MEAN COMPARISON OF "LABELING"
SCORES OF PRIMARY GRADE CHILDREN

GRADE	O-K-1		K-1-2		1-2-3		TOTAL	
TESTING	PRE	POST	PRE	POST	PRE	POST	PRE	POST
Project	28.54	38.64	37.52	49.86	46.88	57.36	37.65	48.62
Comparison	31.96	36.00	37.75	39.57	46.63	47.86	38.78	41.14

It is noted, in Table 25, that the project group obtained a lower mean score in the pre-test, but a higher mean score in the post-test than the comparison group. It is also noted that both the project group and the comparison group gained a mean score of 10.97 points and 2.36 points respectively over a one-year period.

The statistical significance of these differences among the four scores was determined by the ANOVA. The result of ANOVA is presented in Table 26.

TABLE 26

SUMMARY OF ANOVA ON
"LABELING" SCORES--PRIMARY GRADES

SOURCE	SS	df	MS	F
A (Schools)	530.51	1	530.51	3.66
B (Pre or Post)	2337.82	1	2337.82	16.11**
AB	975.23	1	975.23	6.72**
Within Cell	32349.63	223	145.07	

** Significant at .01 level

According to the result found in Table 26, the difference of the mean scores between the project school and the comparison school is not significant. However, the difference of the mean scores between the

pre-test and the post-test and the interaction effect of the two schools and the two testings are found significant at .01 level.

The comparison of the differences between all pairs of means was made by the Newman-Keuls method and found:

a c d b

where, a = pre-test mean of the project group (M = 37.65)

b = post-test mean of the project group (M = 48.62)

c = pre-test mean of the comparison group (M = 38.78)

d = post-test mean of the comparison group (M = 41.14)

that is, the mean score obtained by the project group in the post-test is significantly higher than the other four mean scores. This indicates that the project group performed significantly better in the post-test than they did in the pre-test and that the project group performed significantly better than the comparison group in the post-test.

The result on the "Labeling" technique obtained by the intermediate grade children in the test administered at the end of the project period is presented in Table 27.

TABLE 27

MEAN COMPARISON OF "LABELING"
SCORES OF INTERMEDIATE GRADE CHILDREN

	2-3-4	3-4-5	TOTAL
Project	60.57	67.64	64.10
Comparison	61.57	64.71	63.14

In Table 27, it is noted that the project group 2-3-4 received a 1.00 point lower mean score than the comparison group and that the project group 3-4-5 received a 2.93 point higher mean score than the comparison

group. The total mean comparison between the project group and the comparison group shows only .96 point difference in mean scores favoring the project group. The t test proved that this difference is not significant. In other words, there is no significant difference of scores between the project group and the comparison group, although the former tends to show a higher mean score on the Labeling technique.

In summary, the analysis of "Labeling" scores indicates that the primary grade children in the project school gained significantly higher scores over a one-year period and that they performed significantly better than the comparison group in the post-test. The performance of the intermediate grade children, however, shows no significant difference between the project group and the comparison group, even though the former scored slightly higher than the latter.

Finish the Story

There are four criteria identified in this technique. They are:

Criterion 1. Number of words in first ending.

Criterion 2. Number of words in second ending.

Criterion 3. Number of endings made by the child.

Criterion 4. Flexibility Score.

The group mean scores on each of these four criteria obtained by the primary grade children were calculated and compared in Table 28. Only the number identifying each criterion will be used in this table.

TABLE 28

MEAN COMPARISON OF "FINISH THE STORY" SCORE OF PRIMARY GRADE CHILDREN

CRITERION	0-K-1				K-1-2				1-2-3				TOTAL			
	PROJ.		COMP.		PROJ.		COMP.		PROJ.		COMP.		PROJ.		COMP.	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
1	12.21	17.79	13.29	13.43	10.70	16.00	10.88	11.57	18.83	16.57	18.58	15.36	13.91	16.79	14.25	13.45
2	5.71	11.36	9.00	10.50	8.22	19.21	7.58	9.57	9.63	16.07	16.29	12.21	7.85	15.55	10.96	10.76
3	1.71	1.93	1.75	1.71	1.61	1.71	1.71	1.71	1.71	1.79	1.92	1.79	1.68	1.81	1.79	1.74
4	1.21	2.64	1.67	1.57	1.57	2.79	2.04	2.14	1.75	2.50	2.21	2.36	1.51	2.64	1.97	2.02

Inspecting Table 28, it is interesting to find that the comparison group shows higher pre-test mean scores, while the project group shows higher post-test mean scores on all four criteria. It is also interesting to note that the project group gained on every criterion, while the comparison group lost all but one criterion, Criterion 4. The result found on each of the four criteria will be discussed briefly.

Criterion 1, measuring the number of words in the first ending of the story, indicates that the project group used an average of 2.88 more words, while the comparison group used an average of .80 fewer words on the post-test than they did on the pre-test.

Criterion 2, measuring the number of words in the second ending, shows that the project group used an average of 7.70 more words, while the comparison group used .20 fewer words on the post-test than they did on the pre-test. The number of words used on the post-test by the project group was almost doubled when compared to the pre-test.

Comparing the numbers of words used in the first ending and the second ending, both the project group and the comparison group shows a decrease from the first to the second endings. However, the project group used almost an equal number of words (1.24 words less) in the two endings when they were tested at the end of the project period.

Criterion 3, measuring the average number of endings made by the children, indicates no remarkable differences among the four mean scores, although the project group increased its average by .13 on the post-test.

Criterion 4, measuring the flexibility of children's thinking in concluding the unfinished story two times, shows that both the project and the comparison groups increased slightly in mean socres over a one-year period. Specifically, the project group gained a mean score of 1.13

points in the post-test, and the comparison group gained a mean score of .05 point.

Since the Criterion 4, flexibility score, is the most important, ANOVA was performed only for this criterion to determine the statistical significance of the differences. Table 29 reveals the result of the ANOVA.

TABLE 29

SUMMARY OF ANOVA ON "FLEXIBILITY" SCORE OF THE PRIMARY GRADE CHILDREN

SOURCE	SS	df	MS	F
A (Schools)	.53	1	.53	
B (Pre or Post)	18.95	1	18.95	8.73**
AB	14.74	1	14.74	6.79**
Within Cell	484.32	223	2.17	

** Significant at .01 level

According to the findings in Table 29, the difference between the mean score of the project group and the comparison group is not significant. However, the difference of the mean score between the pre-test and the post-test and the interaction effect of the two groups and the two testings are found significant at .01 level. The Newman-Keuls Method was applied to compare the differences between all pairs of means and found:

a c d b

where, a = pre-test mean of the project group (M = 1.51)

b = post-test mean of the project group (M = 2.64)

c = pre-test mean of the comparison group (M = 1.97)

d = post-test mean of the comparison group (M = 2.02)

that is, the project group obtained a significantly higher flexibility score in the post-test than on the pre-test and the project group received

a significantly higher flexibility score than the comparison group on the post-test.

The result, on the four criteria of the Finish the Story technique, obtained by the intermediate grade children, are revealed in Table 30.

TABLE 30

MEAN COMPARISONS OF "FINISH THE STORY" SCORES OF INTERMEDIATE GRADE CHILDREN

CRITERIA	2-3-4		3-4-5		TOTAL	
	PROJ.	COMP.	PROJ.	COMP.	PROJ.	COMP.
1	37.29	32.57	44.79	31.71	41.04	32.14
2	22.14	35.00	29.86	35.00	26.00	35.00
3	1.79	2.00	1.79	2.00	1.79	2.00
4	2.71	2.71	3.36	3.57	3.04	3.14

According to the mean comparisons made in Table 30, the project group shows a higher mean score on the Criterion 1 but a lower mean score on the other three criteria. Specifically, the project group used an average of 8.90 more words than the comparison group in making the first ending but the former used an average of 9.00 fewer words than the latter in making the second ending; on the third criterion measuring the number of endings made, the project group shows a .21 point lower mean score than the comparison group where everybody gave two endings; and the fourth criterion, the flexibility score, shows that the project group received a .10 point lower than the comparison group. However, the difference shown on the flexibility score between the two groups is not significant.

In summary: the primary grade children in the project school received lower pre-test scores but higher post-test scores than the comparison group on all four criteria; the project group used an average of 2.88 and 7.70 more

words on the post-test than on the pre-test in making the first ending and the second ending respectively, while the comparison group used slightly fewer words in both cases; a few more children in the project group gave two endings on the post-test than on the pre-test, while slightly fewer children in the comparison group gave two endings on the post-test than on the pre-test; and the project group children gained significantly on the flexibility score, while the comparison group gained slightly (not significant) on the flexibility score over a one-year period.

The intermediate grade children in the project school used 8.90 more words in the first ending of the story but used 9.00 fewer words in the second ending than the comparison group; an average of .21 fewer children in the project group gave two endings of the story than the comparison group; and the project group shows a .10 lower mean on the flexibility score than the comparison group.

Findings

From the evaluation data collected, analyzed and reported in the previous sections, it was found that:

1. The three objectives for the teacher inservice education program were met by the evidence shown on the result of the Observation of Discussion Behaviors and the development and compilation of the teacher-prepared lessons (three booklets listing all the topics of lessons are submitted as supporting documents).

According to the results of the Observation of Discussion Behaviors the project school teachers, after their participation in the inservice education program:

a. showed more behaviors utilizing such questioning techniques as focusing, supporting, interpreting and applying;

b. avoided extensively such behaviors as asking rhetorical questions, telling their own opinions and rejecting children's responses;

c. allowed their children more opportunities to participate in the discussion by reducing considerably the amount of teacher talk during the discussions.

2. The two objectives for the pupil performance were met by the evidence shown on the results of the Observation of Discussion Behaviors, the Student Attitude Inventory, and the Critical Thinking Measurement Techniques.

a. On the Observation of Discussion Behaviors, children who were taught by the teachers utilizing the techniques to improve thinking skills responded more to the questions

asked for purposes of focusing, supporting and interpreting data, and showed more interaction with the teachers during the discussion sessions.

b. On the Student Attitude Inventory, children in the project school improved their attitudes toward their teachers and school-related tasks over a two-year period.

c. On the "Grouping" sub-test of the CTMT, the children in the project group showed more flexibility in making groups than the comparison group when they were tested at the end of the project. The project group also gained significantly on the flexibility score over a one-year period.

d. On the "Differences" sub-test of the CTMT, the project group, over a one-year period, greatly improved their ability to notice differences between two items.

e. On the "Cause and Effect" sub-test, the primary grade children in the project school improved their scores significantly over a one-year period. The result shown by the intermediate grade children, when they were tested at the end of the project, indicates that the project group performed significantly better on the inferring causes technique than the comparison group but the two groups performed at the same level on the inferring effects technique.

f. On the "Labeling" sub-test, the project group performed better than the comparison group when they were tested at the end of the project.

g. On the "Finish the Story" sub-test, the primary grade children in the project group improved significantly on the flexibility score over a one-year period but the intermediate grade children showed a slightly lower flexibility score than the comparison group on the test given at the end of the project.

On the basis of the above findings, it is concluded that all the objectives established for the project for both teacher inservice education and pupil performance have been accomplished. Therefore, the Project to Advance Critical Thinking which has been operated for the past three years at the Highland Park Elementary School of the South-Western City School District in Grove City, Ohio, was successful.

E. DISSEMINATION

Objectives

The objectives for dissemination during the 1972-73 school year (the third project year) were: to prepare for dissemination the completed compilation of teacher-prepared lessons for learning units designed to develop thinking skills; to share with interested educators teacher-developed lessons designed to improve children's thinking; to develop video tapes demonstrating the techniques being used by the teachers to develop children's thinking; to assist project school teachers in the development of presentations for dissemination; and, to encourage interested educators and lay persons to visit the project school through articles, newsletters, and other appropriate media.

Dissemination Activities to Attain Objectives

Booklet of Teacher-Prepared Lessons

A booklet listing all of the lessons teachers developed for the lesson plan bank was completed. Each lesson or series of lessons is identified by subject area, topic, level, and the teaching strategy utilized. The teacher who wrote the lesson is given appropriate credit. Many of the BASICS lessons are joined into BASICS sequences (series of single lessons relating to one topic, each building upon the other, so as to analyze the data in a variety of ways and at increasingly higher levels of thinking). These sequences are identified as such and are not

listed as single lessons.

Lesson Plan Bank

Since several teachers in the South-Western City School District other than the project teachers have been and are being trained in the use of the techniques to develop children's thinking, it is anticipated that there will be a greater demand next year for lessons from the lesson plan bank. This year approximately 50 lessons were shared with teachers from other schools. Also, the teachers within the project school utilized lessons from the bank that had been written by other project teachers.

Video Tapes

A series of six video tapes were developed by the project school demonstrating the Taba Teaching Strategies for developing thinking skills. The lessons were written and demonstrated by the teachers. The tapes were narrated by one of the project teachers. Professional editing and copying of the tapes were contracted. A copy of each tape was made and is available on loan to interested educators. Some of the tapes have been utilized by the Inservice Specialists for the South-Western City School District in presentations relating to teaching thinking skills and career education. Some of the parents of the Highland Park children viewed some of the tapes. Presently seven school systems in Ohio have requested information on the use of the video tapes.

Three tapes showing the BASICS techniques for thinking development were completed. The lessons were written and demonstrated by project teachers. These tapes were not completed in time for professional editing. The quality, however, was deemed satisfactory for

dissemination. A copy of each tape is available on loan.

Dissemination Presentations Made by Teachers

Ten of the project teachers were assisted by the project staff in developing dissemination presentations. Three of the teachers prepared a program for a parent discussion group. Seven of the teachers were assisted by the project staff in the development of a dissemination report which was presented in teams at the Ohio Education Association Professional Development Seminar. This presentation consisted of a slide presentation, an audience participation demonstration of selected BASICS techniques, a chart presentation of the Taba Teaching Strategies, and a question-answer time. Approximately 150 persons heard this presentation.

Another teacher prepared a demonstration lesson which she presented for a group of visitors.

Other Dissemination

The Ohio Education Association made a tape recording of the evaluator explaining the project. It was aired over the O. E. A. station which is broadcast into some ninety cities in Ohio.

A project syllabus was published and sent to the interested educators who requested that information.

A newsletter was printed and sent to every certificated employee within the South-Western City School District (800 copies). See Appendix D for a copy.

Approximately 300 visitors to Highland Park were provided an explanation about the project. Two of the teachers had planned demonstration presentations with the children. Some of the visitors observed

these presentations. Among the visitors were teachers of grades kindergarten through twelve, administrators, counselors, psychologists, parents from within the school district, parent study groups from other school systems, student teachers, participating students and college classes from The Ohio State University and Capital University.

Two project teachers and the building principal prepared and presented a two-hour program at an inservice meeting for an elementary school staff in Columbus City Schools. During this presentation, they described the project and distributed project brochures.

Three teachers and the project evaluator planned and presented three fifty-minute sessions at a Fairfield County Right-to-Read meeting. Approximately 100 persons attended these sessions. They were teachers (K-12) and administrators. A brief project explanation was given and project brochures were distributed.

A monthly parent bulletin and board report contained articles about the project. The parent bulletin was distributed to every family having children at Highland Park.

Dissemination Costs

Dissemination costs for the final grant period included:

Video Taping	$911.55
Newsletters	3.80
Book of Lesson Plans	4.82
Presentations by teachers	465.00
Mileage	42.30
Copy paper for lesson plans	2.39
Total	$1429.86 *

* Note: Personnel costs are not included in this amount.

Discussion of Effectiveness of Techniques

The most effective means for relating project information is usually by a direct person-to-person approach. This is especially valuable when the actual participants, the teachers in this case, can make the contacts. Since, however, in a project of this nature this approach alone is not feasible, alternatives must be incorporated.

One rather effective alternative is a newsletter which is short, perhaps one page, and is distributed directly to each individual to which one wishes to disseminate. One copy per school or school system is usually ineffective because it needs to be passed among too many persons.

When planning for dissemination to groups of people, it was found that a demonstration lesson using the group as participants, even though frequently difficult, can be very effective because the group is involved. Another technique in presenting to groups is to vary the media so that the presentation shifts from one media to another and back again. The use of slides, charts, verbal explanations, question-answer, video taped sequences, transparencies, demonstrations with children, and demonstrations utilizing the participants can be intermingled to develop a worthwhile and effective presentation. It would probably be most effective to choose three or four media from among those listed to develop and utilize for any one presentation.

Dissemination Costs--Three Years

The approximate cost of dissemination for the full three-year grant period was $16,363.16. Included in this total are the approximate costs of personnel (one-fourth of the salaries of the project staff); brochure development and distribution; video tape development; paper and

stencils for the newsletter, book of lesson plans, and the actual lesson plans; reimbursement to teachers for dissemination presentations; and mileage when traveling to make presentations.

F. RECOMMENDATIONS

On the basis of the success of the Project to Advance Critical Thinking, the writers of this report recommend that:

1. The program should be extended to other schools;

2. Small groups consisting of fewer than eight children should be used to most effectively utilize any of the techniques provided by this project;

3. An ample amount of resource materials should be available to children to explore and utilize. These materials do not necessarily have to be purchased, but could be newspapers, used magazines, pieces of material, pieces of wood, et cetera;

4. Teachers should share and work cooperatively within the school setting;

5. Teachers should be very sensitive to individual children's needs and skills;

6. Children should be encouraged to express their opinions without fear of being judged by the teacher or by their peers. Any opinion given by each child should be respected;

7. When teachers are attempting new approaches, support personnel and materials are important;

8. Teachers should be provided with formal instruction in procedures for developing children's thinking.

G. ERIC RESUME

(See the following page.)

Abstract

PROJECT TO ADVANCE CRITICAL THINKING: 1973 REPORT

(Project ACT)

Initiated in 1970, the Project ACT was designed to provide children in one elementary school with educational experiences which would help them develop effective thinking skills. The main goal was to develop a program for the sequential development of critical thinking skills in grades kindergarten through five. Through the inservice education program, teachers in the project school were trained in two major teaching strategies programs, among others, called the Hilda Taba Teaching Strategies and BASICS (Building and Applying Strategies for Initial Cognitive Skills). The teachers developed and taught lessons utilizing the teaching strategies. The effectiveness of the project was evaluated by three instruments developed by the project staff: Critical Thinking Measurement Techniques, Observation of Discussion Behaviors, and Student Attitude Inventory. The teachers and the children in one other elementary school within the same school district were utilized as a comparison group. The result indicated that teachers, after their participation in the inservice, changed their discussion behaviors considerably by asking more open questions than closed questions, and by reducing their talking rate. Children in the project school tended to improve significantly in their performance on all three instruments. (Copies of the instruments are included in the Appendix B of the Project Termination Report.)

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APPENDICES

APPENDIX A

Materials and Equipment for:

- -Administrative Details
- -Inservice
- -Lesson Plan Development
- -Evaluation
- -Dissemination
- -Books for Professional Library
- -Books for Children

MATERIALS AND EQUIPMENT FOR ADMINISTRATIVE DETAILS

This listing is not meant to be complete; instead it is included only to give the reader a general idea of the administrative needs.

Electric Typewriter (ea.)	@	$304.50
Storage Cabinets (ea.)	@	48.62
Four-Drawer Letter File w/lock (ea.)	@	47.95
Copy Paper (rm.)	@	23.90
	@	16.50
Mimeograph Stencils		
Stamps (rl. of 100)	@	8.00
Mimeograph Paper (rm.)	@	1.04
Legal Tablets (ea.)	@	.15
Correction Fluid (ea.)	@	.41
Mimeograph Ink (ea.)	@	1.90
Pencils (gr.)	@	4.65
File Pockets (ea.)	@	.17
Sno Pake Correction Kit (ea.)	@	1.10
Flare Markers (ea.)	@	.37
Onion Skin Paper (8½" x 11") (rm.)	@	3.90
Ball Point Pens (dz.)	@	2.45
Catalog Cards (500)	@	3.25
Book Pockets (500)	@	3.90
Book Cards (500)	@	2.30
Index Cards (3" x 5") (pkg.)	@	.095

Administrative Details (Continued)

Index Cards (5" x 8") (pkg.)	@	$ .21
File Folders (bx)	@	1.43
Carbon Paper (500 shts.)	@	7.95
Spirit Masters (8½" x 11") (bx.)	@	6.30
Letterhead (8½" x 11") (1000)	@	13.00
Envelopes (4" x 9½") (1000)	@	13.00
Carbon Ribbons (ea.)	@	1.25
Oak Tag		
Mounting Board (11" x 14")		
Webster New Collegiate Dictionary (ea.)	@	6.10
Paper Punch (ea.)	@	6.98
Paper Cutter, 12" (ea.)	@	10.40
A-Z Index Guides, Letter Size (set)	@	.90
" " " Legal Size (set)	@	1.85
Rubbermaid Desk Trays, Legal Size (ea.)	@	2.60
" " " " , Letter Size (ea.)	@	2.25
Wire Letter Trays (ea.)	@	.72
Brown Clasp Envelopes (10" x 13") (bx.)	@	3.18
Looseleaf Binders (3-ring, 8½" x 11") (ea.)	@	.40
Adding Machine Tape (doz.)	@	5.50

Additional Office Supplies: Paper Clips, Masking Tape, Tape Dispenser, Stamp Pad, Stamp Pad Ink, Staple Removers, Clipboards, Letter Opener, Scratch Pads, Cellophane Tape, Thumb Tacks, Pencil Sharpener, Staples, Rubber Bands

MATERIALS AND EQUIPMENT FOR INSERVICE

Cassette Tapes, C-60 (ea.)	@	$ 1.79
Batteries for Cassette Tape Recorders (ea.)	@	.65
Cassette Tape Recorder (ea.)	@	42.00
BASICS Manuals (ea.)	@	15.00
Taba Teaching Strategies Manuals (ea.)	@	19.95
Wall Charts (36" x 72") of four Rationales (set)	@	25.00
Art Kraft Paper (36" x 875") (rl.)	@	8.10
Felt Tip Markers (ea.)	@	.29

MATERIALS AND EQUIPMENT FOR LESSON PLAN DEVELOPMENT

General Learning Corporation		
#169 Word Building Box (ea.)	@	$ 2.55
#1279 Alphabet Set (ea.)	@	4.40
#1132 Letter Group Set (ea.)	@	9.70
#1107 Invicta Attribute Blocks (set)	@	18.00
Bowmar		
#476 Primary Reading Series (set)	@	17.95
Sunburst Communications		
Newberry I, II Activity Cards (set)	@	15.00
Honors I, II Activity Cards (set)	@	12.00
Benefic Press		
#099887 Primary Math Lab (ea.)	@	47.85
Science Kit, Inc.		
Expendables for S-APA		
Xerox Educational Sciences		
Stepping Into Science (twenty titles)	@	25.00
Comprehensive Classroom Unit in Styrene Storage		
Part A		226.00
Part B		393.00
Part C		430.00
Part D		465.00
Part E		627.00
Part F		750.00
Part G		850.00
Charts and Commentary		38.00
Science Research Associates		
#3-8150 Mathematics Involvement Program (ea.)	@	143.50
Discovering How to Learn (set)	@	97.50
American Guidance Services		
Peabody Language Development Kit Stimulus Cards		
Level 1, #D-313 (complete set)	@	30.00
Level 2, #L-323 (complete set)	@	29.50
Level 3, #J-333 (complete set)	@	20.00
Filmstrips:		
First Things: Values		
The Trouble with Truth, Part I		19.50
You Promised, Part I		19.50
But It Isn't Yours, Part I		19.50

Lesson Plan Development (Continued)

Dobson Evans		
Art Kraft Paper (36" x 875") 60# (rl.)	@	$ 8.10
Felt Tip Markers (ea.)	@	.29
Denoyer-Geppert A.-V.		
#600551 Tadpole Set I (5 fs, 5-12" records and T. Guide)	@	67.50
Harpster A-V		
Teacher Transparency Workbooks		
WR 023 Comprehension Skills (ea.)	@	6.95
WR 040 Introduction to Comprehension Skills (ea.)	@	6.95
WR 041 Critical Thinking (ea.)	@	6.95
Simile II		
Import (simulation)		
Explorers (simulation)		
Continental Press		
Duplicating Masters		
Thinking Skills (Level 1, Level 2) (ea.)	@	3.50
Reading-Thinking Skills (Pre-Primer 1, Pre-Primer 2, Primer 1, Primer 2, 1st Reader 1, 1st Reader 2, Grade 2-1, Grade 2-2, Grade 3-1, Grade 3-2, Grade 4-1, Grade 5-1, Grade 5-2)(ea.)	@	3.50
Beckley Cardy		
Picture and Word Stamps #212-860 (set)	@	12.10
Scholastic		
How Do I Learn? #6966 (fs. series)	@	49.50
Eye Gate House		
Filmstrip and Cassette		
#48A The First Homes	@	11.50
#48E Dwellers in Tents	@	11.50
#48G Homes Around the World	@	11.50
#48I Homes In the U.S. Old and New	@	11.50

Lesson Plan Development (Continued)

Eye Gate House		
Filmstrip only		
#85E Classifying (ea.)	@	$ 6.00
#U3906 Critical Reading (ea.)	@	6.00
#136D Origin and Meaning of Words (ea.)	@	6.00
#136E Knowing and Selecting Words (ea.)	@	6.00
#136F Associating Facts and Ideas (ea.)	@	6.00
#166D Why, Where, How and What (ea.)	@	6.00
#166E Comparison and Contrasts (ea.)	@	6.00
#166I Time and Reality (ea.)	@	6.00
#F151 The Fundamentals of Thinking (set)	@	48.50
Doubleday		
Color Filmloops in Super 8 Cartridges		
#32545 Nomads Across the Sahara (ea.)	@	23.00
#37115 Recreation in Eastern Europe (ea.)	@	23.00
#39575 How Man Obtains Water (ea.)	@	23.00
#39565 Public Recreational Facilities (ea.)	@	23.00
#30545 Children's Responsibilities in Thailand (ea)	@	19.50
#40195 Recreation in An Eskimo Village (ea.)	@	23.50
#40175 Eskimo Hunting and Gathering Food (ea.)	@	23.50
#40135 Eskimo Winter Activities (ea.)	@	23.50
#40115 Eskimo Village (ea.)	@	23.50
#37545 Recreation in Switzerland (ea.)	@	23.50
#37525 Village Life in Switzerland (ea.)	@	21.50
#32595 Family Life of Desert Nomads (ea.)	@	23.50
Educational Reading Services		
Color Filmloops in Super 8 Cartridges		
Changing Seasons: Story of a Year (set)	@	99.80
People Are Different, Aren't They (ea.)	@	24.95
Learning When and Where (ea.)	@	24.95
Holt, Rinehart and Winston		
Color Filmloops in Super 8 Cartridges		
Story Starters		
#88-1409/1 Cave/"Sam"/Attic (ea.)	@	24.95
#88-1425/1 Old McDonald's/House on Fire/ Underwater (ea.)	@	24.95
#88-1433/1 Door in Woods/Balloons (ea.)	@	24.95
Springboards to Writing		
#88-1490/1 Wheels (ea.)	@	24.95
#88-1508/1 Captured/Girl in Mirror (ea.)	@	24.95
#88-1466/1 Boy with Bag/Girl in Woods (ea.)	@	24.95

Lesson Plan Development (Continued)

Holt, Rinehart and Winston

Color Filmloops in Super 8 Cartridges

More Film to Write By

#87-9212/1 Eskimo Seal Hunt (ea.)	@	$ 24.95
#85-0187/1 A Volcano In Action (ea.)	@	24.95

Backyard Ecology

#81-7684/1 Grass (ea.)	@	24.95
#81-7718/1 Log (ea.)	@	24.95
#81-7726/1 Sand (ea.)	@	24.95

Ecology of The U.S.

#81-7742/1 American Prairie (ea.)	@	24.95
#81-7577/1 American Desert (ea.)	@	24.95
#81-7262/1 River (ea.)	@	24.95

Community Services

#87-1434/1 The Fire Department (ea.)	@	24.95
#87-1459/1 The Post Office (ea.)	@	24.95
#87-1483/1 The Police Department (ea.)	@	24.95

Values in Action

#87-1046/1 The Borrowed Bicycle (ea.)	@	24.95
#87-1095/1 The Lost Baseball (ea.)	@	24.95
#87-1103/1 The Cashier's Mistake (ea.)	@	24.95

MATERIALS AND EQUIPMENT FOR EVALUATION

Harcourt, Brace and World		
Watson-Glaser Critical Thinking Appraisal, Goodwin, Watson (ed), 1964, Adult Scale Form Ym (pkg.)	@	$ 9.50
IBM 805 Answer Sheets (pkg.)	@	2.30
IBM 805 Key, Form Ym (ea.)	@	.60
Houghton Mifflin		
Iowa Tests of Basic Skills, Form 5 Booklets #9-67400 (ea.)	@	1.20
Iowa Tests of Basic Skills Answer Sheets #9-67427 (pkg.)	@	9.00
Iowa Tests of Basic Skills Scoring Service (ea.)	@	.59
Cognitive Abilities Tests Primary I, Form 1 Hand Scoring Key 9-62103 (pkg.)	@	5.25
Primary I, Form 1 (pkg.)	@	5.25
Primary II, Form 2 (pkg.)	@	5.25
Cooperative Educational Testing Services		
Sequential Tests of Educational Progress Social Studies (pkg)	@	5.00
Sequential Tests of Educational Progress Science (pkg.)	@	5.00
Sequential Tests of Educational Progress Teachers Handbook (ea.)	@	2.00
Sequential Tests of Educational Progress Manual for Interpreting Social Studies and Science Scores (ea.)	@	1.00
Sequential Tests of Educational Progress Listening (pkg.)	@	5.00
Sequential Tests of Educational Progress Directions for Administration (ea.)	@	1.00
Sequential Tests of Educational Progress NCS Answer Sheets (pkg.)	@	2.00
Sequential Tests of Educational Progress Scoring Service (ea.)	@	.50
Sequential Tests of Educational Progress Item Response Report (ea.)	@	.04
Sequential Tests of Educational Progress Postage to Mail		

Evaluation (Continued)

Test Development of CTMT (Critical Thinking Measurement Techniques)

Drawers with sliding lids for test materials (ea.)	@	$ 8.50
Materials for CTMT		46.56
Key Punch Services		14.50
Photocopies, 8½" x 11"		14.01
Cassette Tapes C-90 (ea.)	@	2.75
Slide Viewers (ea.)	@	1.25

Miscellaneous

Stopwatch		13.50
Olivetti Calculator		345.00
AA Alkaline Batteries for Tape Recorder (ea.)	@	.40
Cassette Tapes C-90 (ea.)	@	2.75

MATERIALS AND EQUIPMENT FOR DISSEMINATION

Brochures (1500)		$150.00
Brochures (2500)		190.00
Art Design and Camera Ready Copy		120.00
Video Tapes	@	22.95
	@	30.00
BASICS Brochures and Guides		No Charge
Taba Brochures and Guides		No Charge
Video Tape Equipment, Sony (Approximate Cost $1,597.00)		Borrowed
Editing for six video tapes		350.00
Copy Paper (rm.)	@	23.90

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APPENDIX B

Measuring Instruments

- Instrument For Observation Of Discussion Behavior
- Student Attitude Inventory
- Critical Thinking Measurement Techniques
- Monthly Survey On Project Related Activities

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INSTRUMENT FOR
OBSERVATION OF DISCUSSION BEHAVIOR

Developed

by

Chang-Yil Ahn, Ph.D.

Director, Project ACT

Title III, ESEA

South-Western City Schools

Grove City, Ohio

July, 1973

Martin L. Stahl, Ph.D.
Superintendent of Schools

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I. INTRODUCTION

There are so many different ways of conducting discussions as well as many different purposes for having discussions in the school. The length of a discussion may vary from a few minutes to a few hours. The number of participants in a discussion group may also vary. The means and length of a discussion and the number of the participants should be contingent upon the purpose of the particular discussion session. Regardless of the purpose, means, and size of the discussion group, it usually involves a leader and participants or a participant. In the classroom setting, the leader is often the teacher and the participants are the children. Depending upon the techniques used by the leader or the behavioral patterns displayed by the leader, the quality of the discussion can vary and the participants' involvement in the discussion can be either positive or negative. The discussion leader should utilize techniques that will stimulate participants' thought processes in conducting a discussion. The discussion leader should also display behaviors that will encourage the participants to express their opinions on the given topic.

The purpose of this instrument is, therefore, to enable a trained observer to record specific questioning techniques used and behaviors displayed by the discussion leader in a discussion session. The degree of participant involvement can also be determined by recording the frequency of responses to a question posed by the leader.

There are thirteen discussion techniques and behaviors identified on the instrument. These are considered to be important factors in a

discussion. The thirteen factors are divided into three major methods on the basis of the characteristics of their use. Focusing, refocusing, and extending are categorized as Data Gathering Methods; clarifying, supporting, organizing, inferring, interpreting, applying, and silencing are categorized as Data Pursuing Methods; and rhetorical, telling and rejecting are categorized as Data Confirming Methods. Each of these terms is defined in the following section.

II. DEFINITION OF TERMS

A. Data Gathering Methods

In order to carry out a discussion, there is usually a topic about which the participants are attempting to extend and refine their concepts. To gather data, the discussion leader may utilize the questioning techniques to focus the participants' thinking and responses on the main topic, to refocus the participants attention back to the main topic following some derailed responses, and to extend a limited response to a more meaningful one. Each of these techniques will be explained in detail.

1. Focusing: An open-ended question may be asked by the discussion leader to set in motion a particular type of thinking operation. This technique is used as a data gathering method which requires children to utilize either observing or recalling skills. For example, the discussion leader may ask questions in the following manner:

"What do you notice about this picture?" (Focus-Observe)

"What can you say about the picture that you saw this morning?" (Focus-Recall)

2. Refocusing: During the discussion, the teacher may want to bring the children's attention back to the original focus by using an open ended question such as:

"Now, look at this picture again, what are the things that you notice about it?" (Refocus-Observe)

"Thinking about the picture that you saw this morning, what are the things that you remember?" (Refocus-Recall)

3. Extending: To gather additional data on the focus of the discussion, the teacher may ask an open question. The purpose of this technique is to elicit a variety of responses from the participants. The questions may be:

"What else do you notice about the picture?" (Extend-Observe)

"What are some different things you remember about the picture?" (Extend-Recall)

Note: The difference between the Extending technique and the Refocusing technique is that the former is used to continue gathering data on the original focusing question, while the latter is used when children seem to be off the original track of the discussion.

B. Data Pursuing Methods

After gathering data on a selected topic, the discussion leader may wish to continue discussing the collected data by pursuing, in more detail, the responses of the participants. Each technique and behavior under this category is explained below.

1. Clarifying: This technique may be used to require a child to elaborate upon his response. The discussion leader may ask the child to engage in this behavior by saying:

"Tell us more about that."

"Say that in a different way."

"What could be an example of that?"

2. Supporting: The teacher may use this technique to help a child develop the ability to defend or uphold his statements. The child is required to think out loud and be responsible by furnishing an appropriate rationale for a specific response. The questions may be:

"Why do you say that clouds are necessary for it to rain?"

"What made you think A is younger than B?"

3. Organizing: The teacher may ask a question which requires children to organize the data in certain ways. This technique can be demonstrated by requiring children to differentiate among the attributes of data in a manner that elicits an operation such as Grouping, Ordering, Noticing Differences, or Noticing Similarities. Examples of these kinds of questions are

"Which of these belong together?" (Grouping)

"Which boy is the next to the tallest?" (Ordering)

"What are some ways car and truck are different?" (Noticing Differences)

"What are some ways boy and girl are alike?" (Noticing Similarities)

4. Inferring: This technique is used to encourage children to see relationships among data. The inferred relationship may not be supportable by immediately available evidence but must be supportable on the basis of data available within the context. Inferring Causes, Effects and Feelings are included in this category. The leader may ask:

"What do you think made that accident happen?" (Causes)

"What happened because of the accident?" (Effects)

"How do you think John felt when he saw the accident?" (Feelings)

5. Interpreting: The teacher may ask a question which requires children to interpret the data that they gathered throughout the discussion. Children may interpret the data by either Summarizing, Labeling, Concluding, or Generalizing. In order to accomplish this objective, the leader may say:

"What are the things that we discussed about this story?" (Summarizing)

"What can you say in one idea about this story?" (Concluding)

"What can you say about stories like this one?" (Generalizing)

"What would be a good name (or title) for this story?" (Labeling)

6. Applying: The teacher may ask a question which encourages children to demonstrate their ability in applying the interpreted data. This ability can be shown by children's behavior in such techniques as Questioning, Classifying, Predicting, Concept Testing, and Making Choices. The examples of these kinds of questions are:

"What do you want to know about the moon?" (Questioning)

"Which of these paintings are oil paintings?" (Classifying)

"What do you think would happen if we turned the lights on?" (Predicting)

"If a watch didn't have any numbers on it, would it still be a watch?" (Concept Testing)

"Which of these would you choose for cleaning the floor?" (Making Choices)

7. Silencing: Keeping silent can be very important in producing a quality discussion. There are two kinds of silence. The one is a thought provoking silence during which the teacher waits for children to think. The other is a negative silence which implies a sort of rejection. Only silence lasting for a noticeable length of time must be recorded.

C. Data Confirming Methods

During a discussion the leader may wish to be sure that correct information is given to the participants. Therefore, the leader may ask the respondent a rhetorical question, or he may just tell the participant about his opinion, or he may reject the response. These are all considered to be data confirming methods.

1. Rhetorical: This type of question has only one correct answer or can be answered either yes or no. There are times when the teacher can use a closed question to continue focusing the discussion. At other times, the teacher may expect no answer from the children when the closed question is used. Too many closed questions may interfere

with the participants' spontaneous thinking. Examples of rhetorical questions are:

"Did you ride a bus to school this morning?" (Expect Yes or No answer)

"Isn't this a good book?" (No answer is expected)

"What is the capital city of Ohio?" (Only one correct answer is expected)

2. Telling: The teacher gives a lecture or an answer without giving the children a chance to react to the issue which is being discussed. Even though it is necessary that participants receive accurate information, too much telling will not allow the children to think and respond.

3. Rejecting: The teacher verbally or otherwise refuses to accept a response from a child. Too much of this behavior will discourage children from participating in the discussion.

III. RECORDING THE OBSERVATION

A. Preliminary Information

First, the observer should fill out all the necessary information on the instrument. This is especially true when the observer is to conduct a large scale observation including various classrooms and schools. This information is very important in data processing and analyzing.

1. Subject: The subject area for which the discussion is designed (e.g. Language Arts, Math, Science, Social Studies)

2. Topic: The main topic of the discussion.

3. Leader: The name of the discussion leader who is conducting the discussion.

4. School: The name of the school where the teacher and the students in the discussion group are attending.

5. Grade: The grade level of the children who are in the discussion.

6. Date: The date the discussion was held.

7. Number of pupils in class: The number of pupils who are present in the particular discussion session.

8. Number participating in discussion: This includes only those children who are actively participating in the discussion by responding to the teacher's questions. This item should be filled out at the end of the observation.

9. Length of observation: The total length of time the particular observation continued. It is recommended that an observation be continued for a minimum of fifteen minutes in order to observe the general behavioral pattern of the discussion group.

10. Note: In this space write down any significant incidents occurring during the discussion which could not be recorded on the instrument. This may be helpful in the interpretation of the observation results.

B. Discussion Leader Behavior

Each of the thirteen categories of the discussion behaviors has two divided lines to record both leader and participants' behaviors. The leader's behavior should be recorded on the line marked "L." Simply place a check mark ( ) in each square provided on line L whenever the teacher or the discussion leader displays any of the thirteen behaviors identified. Only one check mark should be recorded in each square. Use as many squares as necessary to record the frequency of the same or a different behavior when it appears during the discussion session. Use additional sheets of the instrument

if needed. Do not expect to observe all thirteen behaviors in one discussion or in one leader.

C. Participants (Pupil) Behavior

Right under the line marked "L" the letter "P" is shown, for each of the thirteen behaviors, to indicate participants' responses. Tally marks (///) should be used to record participants' responses. Sometimes only one child may respond to a specific question asked by the teacher. At other times two, three, or more children may respond. The tally marks in one square will indicate the number of responses to one question. Place as many tally marks as needed in one square to record the number of responses to each question. Each time the teacher asks another question, use a different square for recording responses to that question.

IV. ANALYZING THE DATA

To analyze the result of the observation, the following procedures should be taken.

1. For the leader behavior, count all the check marks appearing for each behavior. Place these numbers on the left-hand side of each category of behaviors listed on the instrument.
2. For the participants' behavior, count all the tally marks appearing in the squares of each behavior. Place these numbers on the right-hand side of each of the listed behaviors.
3. Transfer the numbers obtained in the above two steps onto the appropriate column of the Summary Table.

To avoid confusion, work only with the Summary Table in the following steps.

4. Frequency scores for leader behavior: Total all the numbers obtained on the first three behaviors under the column marked "L" and place this number in the row marked "G" (data gathering methods); total all the numbers obtained on the next seven behaviors and place this number in row "P" (data pursuing methods); and total all the numbers obtained on the last three behaviors and place this number in row "C" (data confirming methods). The frequency scores are represented by the symbols GL, PL, and CL. The formulae for obtaining these scores are:

   GL = Fo + R + E

   PL = Cl + S + O + If + It + A + Si

   CL = Rh + Te + Rj

5. Frequency scores for the participants' behaviors: Using the numbers appearing under the column marked "P" on the summary table, follow the same procedure as explained in step 4 above. The formulae for obtaining these scores are:

   GP = Fo + R + E

   PP = Cl + S + O + If + It + A + Si

   CP = Rh + Te + Rj

6. Percentage scores for the leader behavior: Using the frequency scores obtained in step 4 above, percentage scores can be easily obtained. The formulae for obtaining these scores are:

$$GL' = \frac{GL}{TL} \times 100$$

$$PL' = \frac{PL}{TL} \times 100$$

$$CL' = \frac{CL}{TL} \times 100$$

Where TL represents the total frequency under column "L" of the summary table.

7. Percentage scores for participants' behaviors: Using the frequency scores obtained in step 5, these scores can be obtained. The formulae for this are:

$$GP' = \frac{GP}{TP} \times 100$$

$$PP' = \frac{PP}{TP} \times 100$$

$$CP' = \frac{CP}{TP} \times 100$$

Where TP represents the total frequency shown under column "P" of the summary table.

8. Ratio scores of leader behavior: Using the percentage scores obtained in step 6, the ratio scores can be obtained. The formula for this is:

$$RL = 7GL' : 3\ PL' : 7\ CL'$$

9. Ratio scores of the participants' behaviors: Using the percentage scores obtained in step 7, the ratio score of the participants' behaviors can be acquired. The formula for this is:

$$RP = 7GP' : 3PP' : 7CP'$$

10. Interaction score: The interaction score between the leader and the participants is the simple comparison between the total frequency score of the leader's behavior and the total frequency of the participants' behaviors. That is,

    I = TL : TP

V. INTERPRETING THE DATA

Interpreting the observed data of discussion behaviors may be dependent upon the particular need and purpose of the observation. The observer may feel free to use his insight in interpreting the data to make it meaningful and useful to his research.

However the general guidelines are:

1. Frequency score: This is a simple tally of the frequency shown on the different categories of discussion behaviors. One teacher's frequency score, therefore, must not be compared with another's. This score can only be used as the basis for calculating the percentage scores.
2. Percentage scores: In order to make a comparison of one teacher's or one group of teachers' scores obtained on the behavioral categories, the percentage scores must be obtained. Depending upon the purpose of the observation, the observer may obtain percentage scores on each of the thirteen behaviors or on each of the three large categories. In either case, all the percentage scores can be compared with other teacher's or other groups of teachers' percentage scores on the identical category of behaviors.

3. Ratio scores: The percentage scores can be compared among the different discussion groups but they cannot be compared among the different categories of behaviors for a given teacher or a group. In order to determine which kinds of behavior were shown most by any one specific teacher or group of teachers observed, the ratio scores must be obtained. Using the ratio scores, for example, we may find that teacher "A" showed more Focusing (Fo) behavior than Organizing (O) behavior; or he used more data pursuing (P) methods than the data gathering (G) method.

4. Interaction score: To determine how much interaction was going on between a discussion leader and a group of participants, the interaction score must be obtained. This score will give an indication as to whether a particular leader gave enough opportunity for the participants to respond.

Leader _____

School _____

Grade _____ Date _____

OBSERVATION OF DISCUSSION BEHAVIOR

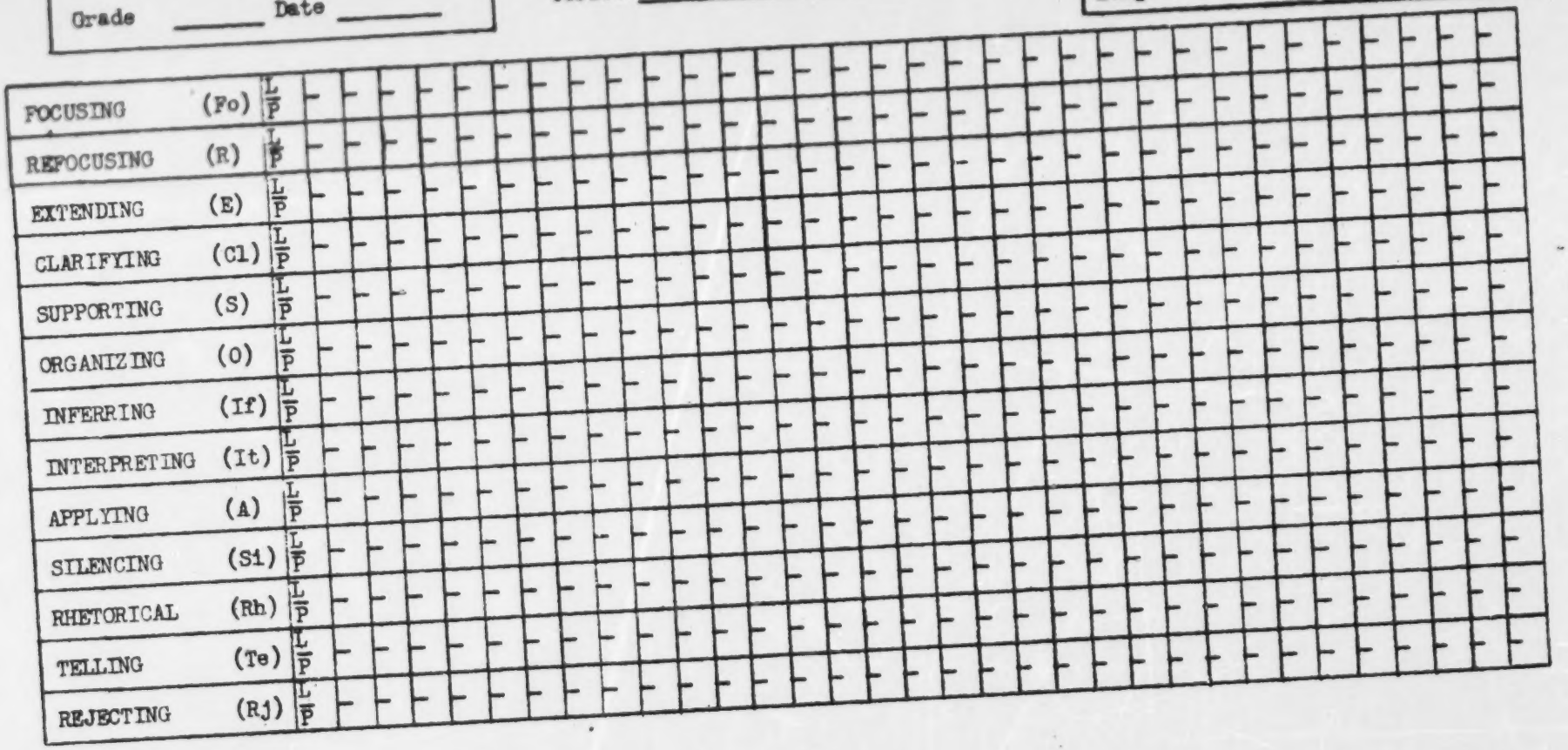
SUBJECT: _____

TOPIC: _____

Number of pupils in class _____

Number participating in discussion _____

Length of observation _____


FOCUSING (Fo) L P
REFOCUSING (R) L P
EXTENDING (E) L P
CLARIFYING (Cl) L P
SUPPORTING (S) L P
ORGANIZING (O) L P
INFERRING (If) L P
INTERPRETING (It) L P
APPLYING (A) L P
SILENCING (Si) L P
RHETORICAL (Rh) L P
TELLING (Te) L P
REJECTING (Rj) L P

NOTE:

OBSERVATION SUMMARY TABLE

SCHOOL _____ DATE _____

Teacher's Name												TOTAL
Leader Participant	L	P	L	P	L	P	L	P	L	P		
Fo												
R												
E												
G												
Cl												
S												
O												
If												
It												
A												
S:												
P												
Rh												
Te												
Rj												
C												
T												

1. Percentage Scores:

$GL' = \frac{GL}{TL} \times 100 =$ $\quad$ $GP' = \frac{GP}{TP} \times 100 =$

$PL' = \frac{PL}{TL} \times 100 =$ $\quad$ $PP' = \frac{PP}{TP} \times 100 =$

$CL' = \frac{CL}{TL} \times 100 =$ $\quad$ $CP' = \frac{CP}{TP} \times 100 =$

2. Ratio Scores:

$RL = 7GL' : 3PL' : 7CL' =$
$RP = 7GP' : 3PP' : 7CP' =$

3. Interaction Score:

$I = TL : TP =$

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STUDENT ATTITUDE INVENTORY

(SAI)

Developed

by

Chang-Yil Ahn, Ph.D.

Director, Project ACT

Title III, ESEA

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STUDENT ATTITUDE INVENTORY (SAI)

I. INTRODUCTION

Depending upon the teachers' attitudes toward their students, the learning environment each teacher creates, and the various programs that each school provides, the learners' attitudes toward their teachers and other school related tasks may differ. As the project involves various new techniques for teaching, it was necessary to determine: (1) What kind of attitudes the two different groups of children--the project and the comparison--hold about their teachers and school related tasks, and (2) How, if any, would their original attitudes be modified as they were exposed to the two different educational settings over a period of time. In an attempt to meet these needs, the project staff constructed an attitude inventory, consisting of forty-three items, to be administered to the children in the third, fourth, and fifth grades. After a close scrutiny by a panel of experts consisting of a school psychologist, an elementary counselor, an elementary school instructional coordinator, and a psychometrist, the items were reduced to thirty-seven. The assumptions that were laid upon the development of the inventory were:

1. When children are fond of their teachers, they are more apt to enjoy going to school and doing school-related tasks.
2. When the teachers are open, flexible, understanding, and show a personal interest in each child, the child will hold positive attitudes toward the teacher and school-related tasks.

3. When teachers are rigid, aloof, and dogmatic, the attitudes of the children will be less positive toward the teacher and school-related tasks.

II. ADMINISTRATION OF THE INVENTORY

Since it is difficult for young children to read each item of the inventory and mark their answers in the proper place, the items are read to them by an adult. Considering the fact that children might be afraid of answering certain teacher-related questions in their teacher's presence, the third person rather than the classroom teacher should administer the inventory in the absence of the teacher.

Each item is to be read twice in the hope that this will allow some children, who might have missed the question the first time, to have another chance to reflect on and record their immediate responses to each statement. The administrator should explain to the children that the inventory is not a test and that there is no right or wrong answer. He should also point out that their teacher will not see how they responded to the inventory.

III. SCORING

The thirty-seven items are classified into two major categories: (1) Attitudes toward teacher; and (2) Attitudes toward school-related tasks. The items included in each of these two categories can be classified into two different attitudinal scales, positive and negative. Each of the thirty-seven items is stated either positively

or negatively. The individual child can indicate his response in three different categories: "Hardly Ever," "Sometimes," or "Almost Always." When a positively stated item receives a response of "Almost Always" the item would be scored as a positive response, while it would be scored as a negative response when answered "Hardly Ever."

A response of "Almost Always" to a positively stated item would get a positive score, while "Hardly Ever" gets a negative score. On the contrary, a response of "Almost Always" to a negatively stated item would receive a negative score, while "Hardly Ever" receives a positive score. Neither a positive nor a negative score is given to a response of "Sometimes."

Each positive score receives +1 point and each negative score gets -1 point. The attitude score can be obtained by subtracting the total minus points from the total plus points. The following figure will summarize the above statements.

WORDING OF STATEMENT	RESPONSE	SCORE	POINT
Positive	Almost Always	Positive	+1
Positive	Hardly Ever	Negative	-1
Negative	Almost Always	Negative	-1
Negative	Hardly Ever	Positive	+1

e.g. 10 Positive Score = +10 points
6 Negative Score = -6 points
The Attitude Score = 10 - 6 = 4

FIGURE 1. SCORING PROCEDURE FOR THE SAI

Each item receiving either a positive or a negative point is shown in Figure 2.

	TEACHER	SCHOOL
Positively Stated Items: +1 for Almost Always -1 for Hardly Ever	2, 4, 9, 12, 18, 22, 24, 30, 31, 33, 37	1, 5, 10, 17, 19, 21, 26, 34, 36
Negatively Stated Items: -1 for Almost Always +1 for Hardly Ever	7, 8, 11, 13, 27, 28, 29	3, 6, 14, 15, 16, 20, 23, 25, 32, 35, 38

FIGURE 2. SCORING KEY FOR THE SAI

IV. VALIDITY AND RELIABILITY OF THE INVENTORY

As each individual item of the inventory was carefully selected and scrutinized by a panel of specialists composed of a school psychologist, an elementary school counselor, an elementary school curriculum coordinator and a psychometrist, and revised after a pilot test, it can be claimed that the inventory has a content validity.

As an attempt to test the internal-consistency of the locally constructed attitude inventory, a split-half reliability was estimated. The Pearson r was computed on each half of both attitude scales and the Spearman-Brown Formula was applied to correct the Pearson r.

The estimates of the split-half reliability of each of the two attitudinal tasks are:

Attitude toward teacher: $r = .77$

Attitude toward school-related tasks: $r = .78$

The result indicates that the internal-consistency of the locally constructed student attitude inventory is at the 60 per cent level.

V. INSTRUMENT

-Instructions-

It is most important to explain to the children how to respond to the inventory. Any form of instruction may be used for the special group of children as long as all the points are clearly made.

The following instructions may serve the purpose for most groups of children.

* * * * * * * *

"You are about to be asked some questions that are related to how you feel about things in school. The total number of questions is thirty-eight. This is not a test. Therefore, there is no right or wrong answer to any of the questions. Everyone in this room can answer differently to the same question. The most important thing is to show exactly how you feel about the things that are asked in the questions. Your teacher will not see the result so please answer frankly. Don't think twice. Just put down how you feel right now."

"You must choose only one answer for each question. You have three choices: Hardly Ever, Sometimes, or Almost Always. If you hardly ever do or feel like what I read, put a check mark on the line before the words "Hardly ever"; if you do or feel like what I read once in a while, put a check mark on the line before the word "Sometimes"; and if you do or feel like what I read almost all the time, put a check mark on the line before the words "Almost Always." Do you understand?"

(Be sure that everybody understands by demonstrating the ways to answer.)

"Be very sure to point with your finger to the same number that I read while I read the question. Then you will not get lost. Listen very carefully because I will read each item only twice. If you cannot answer a question before I read the next one, skip it and follow to the next number that I read. Again, don't think too much. Just put down the way you feel right now. Ready?"

(Be sure that everyone is ready and then start reading the first number and item on the inventory.)

STUDENT ATTITUDE INVENTORY

1. I keep my school work up to date by doing my work every day.
2. I feel that students like most teachers.
3. When my school work is extra long or very hard, I quit or skip quickly through it.
4. My teacher makes school work interesting.
5. I try very hard to make my school work neat when I turn it in.
6. After the first few days or weeks of school I lose interest in school work.
7. My teacher uses words that I can't understand.
8. I think that teachers talk too much.
9. I think that teachers try to treat everyone fairly.
10. My school work is very interesting.
11. Teachers make school work too hard for the average student.
12. I feel that I get the grades that I should get.
13. I think that my teacher is too bossy.
14. I put off doing my school work until the last minute.
15. I get a headache after reading or studying a lot.
16. Noises interrupt me while I am studying.
17. I like to do my school work.
18. My teacher understands my problems with school work.
19. If there is enough time, I take a few minutes to check over my answers before turning in my test paper.
20. I would study more if I could do more things that I like in school.

STUDENT ATTITUDE INVENTORY

21. I try very hard in all of my school work.

22. I ask my teacher to explain an assignment again if it is not clear to me.

23. I waste a lot of time at the beginning of the school year.

24. Teachers try to understand how students feel about school.

25. In most of my subjects, I only do enough to get a passing grade.

26. When I get behind in my school work, I make it up.

27. I think that teachers secretly enjoy giving their students a hard time.

28. Students should have more to say about what they do in school.

29. Teachers think too much about grades.

30. When I have trouble with my school work, I try to talk over the problem with my teacher.

31. I believe that teachers want their students to like them.

32. I feel tired and sleepy when I try to study.

33. I think that my teacher is very kind.

34. I turn in my written work on time.

35. I like to sit in the back of the classroom.

36. I finish all my tests on time.

37. Teachers are very nice to pupils who get poor grades.

38. I waste too much time in school instead of studying.

Part _____

Name _____

Boy _____ Girl _____

Grade _____

1. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

2. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

3. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

4. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

5. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

6. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

7. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

8. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

9. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

10. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

11. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

12. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

13. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

14. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

15. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

16. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

17. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

18. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

19. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

20. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

21. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

22. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

23. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

24. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

25. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

26. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

27. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

28. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

29. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

30. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

31. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

32. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

33. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

34. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

35. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

36. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

37. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

38. _____ Hardly Ever
_____ Sometimes
_____ Almost Always

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CRITICAL THINKING MEASUREMENT TECHNIQUES

(CTMT)

Developed

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CRITICAL THINKING MEASUREMENT TECHNIQUES

As an attempt to measure children's critical thinking skills, a series of five techniques has been developed. The five techniques are 1) Grouping, 2) Cause and Effect, 3) Differences, 4) Labeling, and 5) Finish the Story. All of these five techniques are designed to be administered individually to children in the elementary school.

A. DESCRIPTION OF THE INSTRUMENT

I. GROUPING

A box (23 x 15 x 4") containing thirty-six items (objects) are presented to each child. Using any or all of those thirty-six items each child is asked to make as many different groups as he can on the basis of similar attributes the child can perceive of the various objects. The child is then asked to give his own rationale for making the particular group and to label the group on the basis of his rationale.

The objectives of this technique are to assess the child's ability:

(a) to sort out any relationship among the different objects,

(b) to state the rationale for sorting out the particular relationship, and

(c) to interpret the relationship that he perceives by labeling the group according to his rationale.

The thirty-six items contained in the original box are:

ball, red Christmas ornament with a white hanger

banana, yellow with green leaves and brown stem--plastic

bell, gold Christmas ornament with a gold string to hang--plastic

book, entitled "Zoo Animals" with animal pictures on a red cover--paper

bracelet, gold charm--metal

broom, gold straws with a blue handle which is a pencil

candle, pink

castanets, red and blue--wood and metal

cat, black with green eyes and a long green stem--cloth

comb, white--plastic

corn, gold with a long green stem--plastic

daisy, white flower and green stem--plastic

envelope, white--paper

eraser, cream--rubber

flag, American with a wooden stem

football, brown with two white stripes and yellow letters saying "BENGALS"

fork, silver--stainless steel

frog, green with red tongue, yellow mouth, and red, black, white eyes--rubber

glass, green leaves, red apples, and red-orange decoration--glass

ice cream cone, gold cone and yellow ice cream--plastic

key, gold--metal

lipstick, pink and white--plastic

lollipop, orange with a white stem which is a pen--plastic

marker, black

mirror, round with a hanger handle and red-blue-green flowers decoration on back

napkin, yellow--paper

nut pick--metal

oranges, three oranges on a brown stem with three green leaves--plastic

paper, purple rectangle

penny

pipe cleaner, purple

ring, gold with three imitation emeralds--metal

screwdriver, yellow handle with green edge--metal

snowflake, white Christmas ornament with a hanger--plastic

spoon, silver--stainless steel

stamps, a collection of Presidents of the United States

On the prepared response recording sheet, place a check mark next to each object used in making groups. Proper spaces are provided to record the rationale for the specific groupings. A sample of the response recording sheet is shown on page B-44.

Instruction for Test Administration

"In this box there are many different kinds of things. I want you to find things that are alike in some way and put them together to

make a group. Make as many different groups as you can out of these objects, and I will count them. You may begin now."

(When the child finishes, say --)

"Very good! Tell me why you put those objects together." -- (Rationale)

(When the child gives the rationale, say --)

"What name can you give this group?"

(When the child gives the name for the group, say --)

"Now put those back in the box and make another group."

(When the child finishes, say --)

"Why did you put _____, _____, _____, and _____ together?"

(Name all the objects the child used in making the group, if he used less than four objects.)

(When the child uses more than four objects, simply say "Why did you put those together?")

(When the child gives the rationale, say --)

"What would you call this group?"

(Continue asking the above three questions until the child says that he cannot find any more groups. Make sure that the child puts the items back in the box before making another group. Then say --)

"Good, _____, you have done a very good job. I enjoyed working with you."

Scoring Directions

First of all scan each line horizontally. Count the total number of times each object was used and write the number on the left side of the name of the object. Be sure to scan extra sheets as well.

1. The total number of groups made.

   This score is a simple tally of the total number of groupings made by the child. Place the number in Column 1 of the Summary Table. When there was only one object used in making a group, it is not considered as a group and should not be counted.

2. Total number of objects used.

   Considering each object as one unit, count all the objects used at lease once. Place the number in Column 2 of the Summary Table.

3. Total number of objects used more than once.

   Count the objects used more than once by the child. Place the number in Column 3 of the Summary Table.

4. Average number of items usdd in making each group.

   Count all the check marks shown on the recording sheet. Divide this number by the number of groups made. Place the answer in Column 4 of the Summary Table.

5. Total number of appropriate rationales given.

   On the lower part of the answer sheet each child has given a reason for placing the objects together. Count all the responses given by the child. Circle any responses that are extremely inappropriate and such answers as "I don't know," "You guess."

Subtract the number of responses circled from the total number of rationales given. Place this number in Column 5 of the Summary Table.

Note: When a child says, "because I want to" when he was asked to give a rationale for grouping, ask him again "why" he wanted to, unless he refuses to give his rationale.

The next step is to classify the rationales given for grouping the objects together. There are five major classifications: Relational-Contextual, Descriptive, Inferential, Categorical, and Mixed. Each of the five classifications is briefly explained below.

A. Relational-Contextual (R-C)

Children group the different objects together by perceiving a particular relationship among the various attributes that different objects possess. These relationships may be categorized as either Locational, Temporal, or Functional. Each of these three different relationships is explained below.

(1) Locational (L)--Objects are grouped because they are found together in the same place in the child's experience. For example:

(i) Spoon, fork, glass and napkin are grouped together because they all are found on the dinner table.

(ii) Ball, bell and snowflake are grouped together because they all are found on the Christmas Tree.

(2) Temporal (T)--Objects grouped together because of some sort of time relationship that the child notices. For example:

(i) Ball, bell, and snowflake are grouped together because they all are found at Christmas time.

(ii) Comb, lipstick, and mirror are grouped together because Mother uses them before she goes out.

(3) Functional (F)--Objects grouped because they operate together, or because some happen in concert or as a result of the action of others. For example:

(i) Spoon and ice cream are grouped together because we eat ice cream with spoon.

(ii) Envelope and stamps are grouped together because we put a stamp on the envelope to mail a letter.

(iii) Lollipop and penny are grouped together because we buy a lollipop with a penny.

B. Descriptive (D)

Objects grouped together because they have the same appearance, color, texture, or they are made of same material. When children are asked to give rationale for a particular grouping, they may simply describe the similar attributes that they perceive on the different objects used in that grouping. For example:

(i) Ball, castanets, orange and ring are grouped together because they all are round. (Appearance)

(ii) Ball, bracelet, key and ring are grouped together because they all are gold. (Color)

(iii) Key, nutpick, spoon and fork are grouped together because they all are made of something hard. (Texture)

C. Inferential (I)

Objects are grouped together because they belong to a certain group of things that have a common characteristic on an abstract level. Most of the action words that infer a certain group without mentioning the specific group are considered inferential. For example:

(i) Spoon and fork are together because we eat with them (this infers that the two objects are eating tools).

(ii) Banana, corn, ice-cream cone and oranges are grouped together because we eat them (this infers that the four objects are food).

(iii) Bracelet and ring are grouped together because Mother wears them (this infers that the two objects are jewelry).

D. Categorical (C)

Objects are grouped together because they belong to a class of things the name of which is abstract in that it does not refer to any tangible quality like color, shape or material, but rather to an abstracted quality of the whole group. For example:

(i) Ball, bell and snowflake are together because they are Christmas ornaments.

(ii) Broom and pipe cleaner are grouped together because they are cleaning instruments.

(iii) Banana, corn and lollipop are grouped together because they all are things to eat.

Note:

1. The difference between Inferential and Categorical Classifications is whether the child gives the rationale for grouping by simply inferring an abstracted quality of the group or by using a specific abstracted name of the group.
2. In some cases, it is hard to differentiate a descriptive grouping from a categorical. When in doubt, put the phrase, "made of" in front of the noun, which is given as a rationale, to see if it makes a proper sentence. If it is, the grouping is a descriptive and if it does not make any sense, the grouping is a categorical. For example,
   (i) corn, ice-cream cone and oranges are together because they are plastic----made of plastic (yes)--descriptive.
   (ii) corn, ice-cream cone and oranges are together because they are food----made of food (no)--categorical.

E. Mixed (M)

Children may start a group using one kind of grouping criterion and then switch to another criterion. That is, they lose the thread of reasoning applying to the whole group and, instead, look at the last item in a group and add another on a different basis. This is not a good quality of grouping method. For example:

(1) Banana and oranges are together because they are <u>fruit</u> (categorical) and add a daisy because both banana and daisy have yellow in them (descriptive).

(ii) Flag and football are together because they raise the flag before football game starts (functional) and then add ball because football and ball are round (descriptive).

Read each rationale given by the child and classify it into one of the five possible classifications. Classify Relational-Contextual Classification further into Locational (L), Temporal (T), and Functional (F). Put the abbreviation of each Classification next to each rationale. When two different levels of classification appear in rationale given for grouping, credit should be given to the higher level of classification.

The hierarchy of the classification is:

a. Categorical (C) -- Highest

b. Inferential (I)

c. Descriptive (D)

d. Relational-Contextual (R-C)

i. Locational
ii. Temporal
iii. Functional

} all are classified as R-C

e. Mixed (M) -- Lowest

6. Count the number of L classifications and place this number in Column 6 of the Summary Table.
7. Count the number of T classifications and place this number in Column 7 of the Summary Table.
8. Count the number of F classifications and place this number in Column 8 of the Summary Table.
9. Total the numbers in Columns 6, 7, and 8 and place this number in Column 9 of the Summary Table.

10. Count the number of D classifications and place this number in Column 10 of the Summary Table.

11. Count the number of I classifications and place this number in Column 11 of the Summary Table.

12. Count the number of C classifications and place this number in Column 12 of the Summary Table.

13. Count the number of M classifications and place this number in Column 13 of the Summary Table.

14. Inspect Columns 9, 10, 11, 12, and 13. How many of these five Columns have a 1 or more in it for this child? Place this number (could be 0 through 5) in Column 14 of the Summary Table.

15. Total number of appropriate labels given. On the lower part of the answer sheet (right hand side) there is a place to record the name or label a child has given to a group. Any name given by the child is considered a correct answer, if it follows the rationale given by the child. Put a check mark by each correct response. Count the number of check marks and place this number in Column 14 of the Summary Table.

16. Flexibility Score: Total all the numbers entered in Columns 1, 2, 3, 5, 14 and 15. Place this total in Column 16. This score will give some indication of the child's flexibility in thinking operation.

17. Quality Score: Total of {(numbers in Column 9) + (numbers in Column 10 x 2) + (numbers in Column 11 x 3) + (numbers in Column 12 x 3)} Place this total in Column 17. This score indicates the quality of the groupings made by the child.

Check for Accuracy: The number in Column 5 should be the same as the total number in Columns 9, 10, 11, 12, and 13.

GROUPING EXERCISES

GROUPED ITEMS	RATIONALE	CLASSIFICATION
1. lollipop, marker	both write	
2. eraser, frog	both rubber	
3. banana, corn	both things to eat	
4. glass, mirror	both glass	
5. castanets, football, frog	all toys	
6. corn, orange	you eat both	
7. fork, spoon	both "go in" silverware	
8. broom, flag	witches ride on a stick	
9. penny, rings, nutpick	all metals	
10. banana, corn, daisy, oranges	they all grow	
11. key, penny, stamp	all have letters on them	
12. ball, broom	both have yarn on them	
13. book, envelope	both open	
14. flag, napkin	when you hold them the wind makes them move	
15. cat, frog, marker	they have black on them and the cat and frog have green on them	
16. ball, lipstick, rings	ball and stamps have red, ring and stamp have green, lipstick and stamp have purple	
17. envelope, lollipop, paper, stamps	you write a letter, put it in the envelope and put a stamp on it to mail it	
18. ball, bell, snowflake	you can put them on a Christmas tree	

GROUPED ITEMS	RATIONALE	CLASSIFICATION
19. bracelet, lipstick	women like them and they make you pretty	_____
20. envelope, paper	they both are paper	_____
21. cat, glass	kitty can drink out of glass	_____
22. eraser, rings	you can lay the ring on this	_____
23. bracelet, mirror	look in the mirror to put on necklace	_____
24. cat, frog	both are animals	_____
25. banana, corn, daisy	all grow in the ground	_____
26. envelope, paper, stamps	use them all when you mail a letter	_____
27. bell, snowflake	use them at Christmas time	_____
28. glass, mirror	both are glass and they can break very easily	_____
29. ball, football	both are balls	_____
30. lipstick, mirror	you look in mirror to put lipstick on	_____

CORRECT CLASSIFICATION OF GROUPING EXERCISES

	CLASSIFICATION	REASON
1.	I	Infers that they are writing instruments
2.	D	Describes the material that they are made of
3.	C	Categorizes them as things that we eat
4.	D	Describes the material that they are made of
5.	C	Categorizes them as toys
6.	I	Infers that they are food
7.	C	The key word here is "silverware" not "go in"
8.	I	Infers that they are witches' things
9.	D	Describes the material that they are made of
10.	I	Infers that they are plants
11.	D	Describes the common attribute
12.	D	Describes the common attribute
13.	D	Describes the common attribute
14.	D	Describes that they are light
15.	D	The first statement is good enough as a rationale
16.	M	Doesn't describe all four objects at the same time
17.	F	All four objects are functioning together eventually
18.	L	Indicates the place where they are found
19.	I	Infers that they are women's favorites
20.	D	Describes the material
21.	F	Explains how they function together
22.	F	Explains how they function together
23.	F	Bracelet was perceived as a necklace--acceptable
24.	C	Categorizes them in one abstract name

CLASSIFICATION	REASON
25. L	Indicates the place where they grow
26. T	The key word here is "when"
27. T	Indicates when they are used
28. D	Describes the material
29. C	Puts them in one category
30. F	Explains how they function together

GROUPING RESPONSE RECORDING SHEET

School _____ Name _____

Grade _____ Date _____

	1	2	3	4	5	6	7	8	9	10
ball										
banana										
bell										
book										
bracelet										
broom										
candle										
castanets										
cat										
comb										
corn										
daisy										
envelope										
eraser										
flag										
football										
fork										
frog										
glass										
ice cream cone										
key										
lipstick										
lollipop										
marker										
mirror										
napkin										
nut pick										
oranges										
paper										
penny										
pipe cleaner										
ring										
screwdriver										
snowflake										
spoon										
stamps										

RATIONALE

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

NAME

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

SUMMARY TABLE FOR GROUPING

School _____ Tested: Fall _____

Grade _____ Spring _____

Examiner _____ Year _____

Name of Child	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.																	
2.																	
3.																	
4.																	
5.																	
6.																	
7.																	
8.																	
9.																	
10.																	

Legend:

Column 1: Total number of groups made
2: Total number of objects used
3: Total number of objects used more than once
4: Average number of items used in making each group
5: Total number of appropriate rationales given
6: Total number of locational groupings
7: Total number of temporal groupings
8: Total number of functional groupings
9: Total number of relational-contextual groupings
10: Total number of descriptive groupings
11: Total number of inferential groupings
12: Total number of categorical groupings
13: Total number of mixed groupings
14: Total number of styles of categorization used
15: Total number of appropriate labels given
16: Flexibility score: total of Columns 1, 2, 3, 5, 14, 15
17: Quality score: {(number in Column 9) + (number in Column 10 x 2) + (number in Column 11 x 3) + (number in Column 12 x 3)}

II. DIFFERENCES

Twenty pairs of words are given to each child to measure his ability to differentiate one word from its counterpart. The first two pairs of words are presented together with matching objects and the rest of the eighteen pairs are presented merely in words.

The objective of this technique is to assess children's ability to identify one or more differences in attributes of two objects or noun concepts. Ideational fluency can be assessed by noting how many different answers a child can give to each two-variable stimulus.

Test Items and Instruction for Administration

1. Boy and Girl Paper Dolls

   Present a child with a paper boy doll and a paper girl doll and say:
   "Look at these two things. I want you to tell me how they are different. Tell me as many differences as you can."
   (Write down the child's responses on a separate answer sheet provided.)
   (When the child stops after giving one or more differences, say:)
   "Good, can you find any other differences?"
   (Go on to next question when the child says "no.")
   (When the child fails or cannot give an answer after the first instruction to find differences, say:)
   "Here are the differences. This is a boy (point to the boy doll) and this is a girl (point to the girl doll). They are also different because he is wearing a pair of slacks and she is wearing a skirt. Do you understand?"
   (Then proceed to Item 2)

2. Large red circle and small yellow square.

   Present the two items to the child and say:

   "Now look at these two. How are they different? Tell me as many ways as you can that they are different."

   (Proceed to the next item when the child indicates that he cannot find any more differences.)

   With the remainder of the items, merely say, "How are _____ and _____ different? Tell me as many ways as you can that _____ and _____ are different?"

3. Shoe -- Hat
4. Truck -- Car
5. Radio -- Television
6. Teacher -- Mother
7. Santa Claus -- Easter Bunny
8. Robin -- Parakeet
9. Newspaper -- Magazine
10. House -- Apartment
11. Water -- 7-Up
12. Stove -- Refrigerator
13. Snow -- Rain
14. Moon -- Sun
15. Doll -- Puppet
16. Eyes -- Ears

17. Winter -- Summer

18. Water -- Ice Cube

19. Motorcycle -- Bicycle

20. Smile -- Laugh

Scoring Direction

To be considered a difference, a response must capture a distinct difference even though it may be a small detail rather than a gross quality.

Each difference response is inspected and scored:

3 points if the difference is labeled with one concept idea. For example:

they are a different sex

they have different clothes

they have different hair

they are different sizes

2 points if the difference is indicated by noting and verbalizing a difference on the same basis of attributes for each item presented. For example:

one has curly hair--one does not (may or may not mention the latter part)

one has darker hair than the other

one is fat, the other one is skinny

1 point if the difference is indicated by noting and verbalizing a difference but on a different attribute. For example:

Santa is fat and Easter Bunny hops

rain is wet and snow is cold

moon comes up at night, sun is bright

0 points where no clear difference can be detected. Similarities are scored zero. Where the difference is clear but not appropriately drawn from the noticeable attributes a score of zero is given: For example:

> In the newspaper, you read what is happening and in the magazine you turn pages.
>
> They both have the same color. (Similarities)

The Procedure:

1. Add the number of difference responses given for the twenty items. (Note: The score given for the response is not considered in this count.) Place the sum in Column 1 of the Summary Table.
2. Largest number of answers given to a single item. Inspect the number of responses for each of the twenty items and find the item which has the largest number of differences given. Place the number of responses in Column 2 of the Summary Table.
3. Total the 3 point resonses, place the sum in Column 3 of the Summary Table.
4. Total the 2 point responses, place the sum in Column 4 of the Summary Table.
5. Total the 1 point responses, place the sum in Column 5 of the Summary Table.
6. Total the 0 point responses, place the sum in Column 6 of the Summary Table.

7. Multiply the number entered in Column 3 by 3 and

   " " " " " " 4 by 2 and

   " " " " " " 5 by 1.

   Total all the three answers and place the sum in Column 7 of the Summary Table.

8. Inspect all the 20 items and count all the items to which at least one difference was given. Place this number, which is between 0 and 20, in Column 8 of the Summary Table.

The Summary Table for Differences is shown on the next page.

SUMMARY TABLE FOR DIFFERENCES

School _____ Tested: Fall ____

Grade _____ Spring ____

Examiner _____ Year ____

Name of Child	1	2	3	4	5	6	7	8
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								

Legend:

Column 1: Total number of difference responses
2: Largest number of answers given to a single item
3: Total number of 3 point responses
4: Total number of 2 point responses
5: Total number of 1 point responses
6: Total number of 0 point responses
7: Differences score: Total of ((number in Column 3 x 3) + (number in Column 4 x 2) + (number in Column 5))
8. Total number of items attempted

III. CAUSE AND EFFECT

Nine slides describing some sort of incident are presented in a sequence to each child. Each child, first, is asked to give his perception of what is happening in that particular slide, then he is asked to infer what caused that incident and what would be the effect of the incident . The pictures in the slides are so vague that each child may perceive them differently.

The objectives of this technique are:

a. To assess the child's ability to infer possible causes and effects of a certain incident that he perceives from the drawings on slides.

b. To assess the flexibility of inferring behavior.

Description of the Slides

As the drawings in the slides are vague each child may perceive them differently. However the general description of each slide is given below.

Slide 1. House on fire--firemen attempting to put fire out.

Slide 2. A two-car wreck under a stop light.

Slide 3. A dog and a cat fighting.

Slide 4. A boy getting a whipping from his father.

Slide 5. Two boys encountering each other.

Slide 6. A man fishing and an empty boat floating free in the water.

Slide 7. A boy giving flowers to a lady.

Slide 8. A girl sitting on a chair crying.

Slide 9. No gravity--all objects including a man floating in the air.

Instruction for Test Administration

The examinee should be given a slide viewer and be shown how to use it. The examiner should have a pencil and paper to record the child's responses. He should write down all the causes and effects given by the child. While holding the nine slides, the examiner starts by saying, "I have some drawings on slides that I want you to look at. These drawings are about all kinds of things. I want you to tell me what is going on in the pictures. Then tell what you think happens before and after the picture."

Present the first slide to the child and say,

"Now, _____, look at the first picture and tell me what is happening."

(Allow a few seconds to pause before and after child's response. Then say - - -)

"You said _____ _____ _____ are going on in the picture. What do you think made them happen?"

(After each response, say - - -)

"Tell me what else made them (or it) happen."

(Discontinue at the first refusal and start asking the effects of the incident by saying,)

"Now, _____, look at the picture again, but this time I want you to tell me as many different outcomes as you can about the things

that you said are happening. You said _____ _____ _____ are going on in the picture. What do you think happens because of them?"

(After each response, say - -)

"What else do you think happens because of the things going on in the picture?"

(Go on to the second picture at the first refusal.)

Note:

When the child gives a questionable response the examiner may ask the child to clarify his response by using one of the following forms of questioning technique.

A. To support cause given for the picture:

"Why do you think _____ _____ _____ made it happen?"

B. To support result or effect of what happens in the picture:

"Why do you think the things in the picture led to _____ _____ _____?"

Scoring Direction

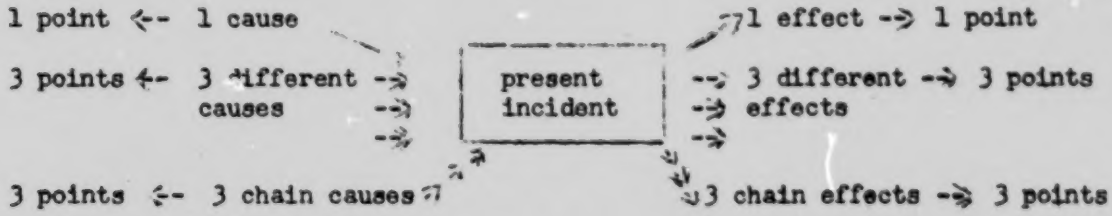
As the pictures are so vague, each child may perceive them differently. Therefore, the description of the slide given by the child can be anything, but the cause and effect should be related to the given description.

The child receives credit for an answer whenever it is a plausible cause or effect for the given slide as described by him. When the child gives two plausible causes or effects, he receives

two points. That is one point credit should be given to each clearly stated cause or effect. The cause must be given as the first answer and the effect as the second answer. If the child gives an effect when he was asked to give a cause, no credit should be given. The same is true if the child gives a cause when he was asked to give an effect.

The child may give three independent causes or effects for a certain slide or three causes or effects that have a chain relationship among them. In either case, the child should be given three points when they are clearly stated plausible causes or effects.

The following diagram will show a clearer picture of the sequences:



Example:

Slide 1

1 cause (1 point):

Someone might have turned the stove up too high and caught on fire.

2 different causes (2 points):

Someone was (1) playing with matches or maybe someone was, (2) running around the house with fire on sticks and putting it on the house.

3 chain effects (3 points):

They probably (1) put out the fire and (2) got the person who did it and, (3) put the person in jail.

Slide 7

1 cause (1 point):

The boy went out and came back with some flowers.

2 chain causes (2 points):

(1) He could have gone down to the greenhouse to get his mom some flowers. (2) The boy's mother could have bought him something so he gave her flowers.

1 effect (1 point):

Mother put the flowers in a vase.

Read each cause and effect given by the child to each slide and write the letter "C" for cause and "E" for effect in front of each response. An "X" mark should be placed in front of a wrong response such as an extremely inappropriate cause or effect, an effect given for the cause and a cause given for the effect.

When all the responses are properly checked and scored, count the number of causes and effects separately for each slide and place the number in the appropriate column in the Summary Table.

The Summary Table for Cause and Effect is shown on the next page.

SUMMARY TABLE FOR CAUSE AND EFFECT

School _____ Tested: Fall ____

Grade _____ Spring ____

Examiner _____ Year ____

Name of Child	1		2		3		4		5		6		7		8		9		T	
	C	E	C	E	C	E	C	E	C	E	C	E	C	E	C	E	C	E	C	E
1.																				
2.																				
3.																				
4.																				
5.																				
6.																				
7.																				
8.																				
9.																				
10.																				

Legend:

1. The number on the first line identifies the slide.

2. In Column C for each slide, put the number of causes given for that slide.

3. In Column E for each slide, put the number of effects given for that slide.

4. Total the causes given for all nine slides and place the number in Column C under T.

5. Total the effects given for all nine slides and place the number in E under T.

IV. LABELING

Forty items which consist of three different words in each item are presented to each child. He is then asked to label those three words by one common name.

The objective of this technique is to assess children's ability to give a name or label to a group of items by recognizing the particular relationship among the items. This skill is one of the processes of concept development and involves the abstracting of certain common characteristics in an array of objects and the discovering of a label to encompass those common characteristics.

Test Items and Instruction for Administration

All the items are presented to each child only in words. Start the test by saying, "I am going to give you groups of words. I want you to listen carefully and tell me a good name for each group of words."

(Then start the first question by saying --)

"What are red--green--blue?"

(If the child gives the correct label, proceed to the second item by repeating "what are" before giving the words.)

(If the child fails, say --)

"I'll tell you about three other things: ball--doll--marbles. They are all toys. Now tell me what are red--green--blue?"

(If the child still fails, say "they are colors," and then proceed to Item 2.)

(Write down the first response.)

QUESTIONS	KEYS
2. Tom--Charley--Henry	names, boys, men
3. apple--hamburger--ice cream	food, round food
4. dog--cat--elephant	animals
5. chair--table--couch	furniture
6. Ford--Chevrolet--Plymouth	cars, automobiles, makes of cars, wheels
7. turkey--robin--sparrow	birds, flying animals
8. maple--oak--pine	trees
9. rose--tulip--lily	flowers
10. perch--salmon--tuna	fish
11. penny--nickel--dime	coins
12. saw--ax--hammer	tools
13. England--Germany--Russia	countries, foreign countries
14. Pepsi--Coke--7-Up	drinks, soft drinks, pop
15. Lassie--Rin Tin Tin--Snoopy	dogs, dog's names, TV Shows
16. a--f--p	letters of the alphabet, letters
17. Indian--Atlantic--Pacific	oceans
18. Columbus--DeSoto--Magellan	explorers, discoverers
19. molar--bicuspid--wisdom	teeth
20. Kennedy--Washington--Truman	presidents, former (or ex)
21. Black Beauty--Mr. Ed--Man-of-War	horses
22. apple--pear--banana	fruits

23.	corn--spinach--peas	vegetables
24.	Beatles--Mamas and Papas--Jefferson Airplanes	singing groups, rock groups
25.	grizzley--brown--polar	bears
26.	Joe Louis--Cassius Clay--Joe Frazier	boxers, fighters, heavyweight champs
27.	ruby--diamond--sapphire	jewels, gems, precious stones
28.	Kentucky Derby--Preakness--Belmont Stakes	Triple Crown, horse races, race tracks
29.	Mississippi--Amazon--Thames	rivers
30.	Himalayas--Rocky--Alps	mountains, mountain ranges
31.	I-71--I-70--I-75	freeways, highways, roads inter-states
32.	707--DC8--747	jets, airplanes
33.	heart--liver--pancreas	organs, parts of body
34.	pork chops--steak--hamburger	meats
35.	basketball--football--hockey	sports, competitive games
36.	spring--autumn--winter	seasons, seasons of the year
37.	Monday--Wednesday--Saturday	days, days of the week
38.	January--April--November	months, months of the year
39.	Edison--Newton--Einstein	scientists
40.	Earth--Jupiter--Mars	planets

Scoring Direction

Two different scores are given to each answer according to the quality of answers.

1. Give 2 points for each correct answer which is identified on the Scoring Key.
2. Give 1 point for any other reasonable and acceptable answer which is not identified as a correct answer on the Scoring Key.
3. Give 0 points when the answer is definitely wrong.

Place the score next to each answer. Do not give any more than 2 points for any one item even though there were two identified correct answers given. Give the highest credit when two different quality of answers were given for any one item. Count all the 2 point answers and 1 point answers separately and place the total in the appropriate columns on the Summary Table.

The Summary Table for Labeling is shown on the next page.

SUMMARY TABLE FOR LABELING

School _____ Tested: Fall ____

Grade _____ Spring ____

Examiner _____ Year ____

Name of Child	Number of 2 Point Answers	Number of 1 Point Answers	Total
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Legend:

1. In the first column, place the number of answers for which 2 points credit was given.

2. In the second column, place the number of answers for which 1 point credit was given.

3. Multiply the number entered in the first column by 2 plus the number entered in the second column and place that total in the third column (total score) that is, [(number in first column X 2) + (number in second column) = Total]

V. FINISH THE STORY

A short, unfinished story is read to each child. The child is then asked to finish the story by making up the possible conclusion of the story. Each child must supply two different endings.

The objectives of this technique are:

A. To assess the child's spontaneous fluency which is indicated by the amount of verbalization used by the child in formulating two endings.

B. To assess the flexibility in thinking which is indicated by the degree of difference between the first and the second response.

This technique will also indirectly measure the child's ability to attend to and to recall specific data presented to him as these are indispensable for producing any appropriate response. The child's skills to process data by inferring possible causes and effects are exercised in this technique.

Instruction for Administration and the Story

The examiner is required to write down exactly what the child says to complete the story. Thus, he must have a pencil and papers before reading the story to the child. Then read the following directions.

A. Direction

"I am going to read a story to you. It is not a complete story

because there is no ending. Listen carefully to the part I read to you and then you finish the story for me. Make up any ending you like so we have a whole story. Do you understand? Here is the story."

B. Story:

Once upon a time there was a small boy who lived with his mother in a town called Villageton. The boy and his mother loved each other very much and always tried to make each other happy. They didn't have much money, but every night they gave each other a small present when the boy arrived home from school. Many times the boy would buy his mother a stick of apple gum (her favorite kind) and the mother would make her son a special little pie or cake to eat after his dinner. When money was scarce and the little boy had no money to buy his mother gum, he would pick a bouquet of violets or bring her a pretty leaf he found under a tree. Every night he would hurry home to give his mother her little gift and she would be waiting by the door with a big smile, a kiss, and a little surprise for her son.

One day after school the little boy ran home with his gift of apple gum to give to his mother. He raced around the corner, looked at the door, and stopped in surprise. His mother was not there. Where could she be? He threw open the door, ran in and looked all around the little house. His mother was not there--not any place in the house. The little boy began to cry. Where was his mother? She was always there by the door waiting for him. What had happened?

- -

Now, _____, you finish this story. Make up an ending."

(After his first ending, say - -)

"All right. Now make the story end a different way."

(If the child does not seem to remember the story, ask him by saying --)

"Do you want me to read you the first part of the story again?"

(Read it to him if needed. And make a note of this.)

Scoring Direction

There are four different scores to be identified for this technique:

1. number of words in the first answer
2. number of words in the second answer
3. number of answers
4. flexibility score

The Procedure:

The following procedure is to be followed to score the Finish the Story technique.

1. Count the number of words in the first ending to the story and place this number in Column 1 of the Summary Table.
2. Count the number of words in the second ending to the story and place this number in Column 2 of the Summary Table.
3. Count the number of endings to the story which was given by the child and place this number in Column 3 of the Summary Table. This number should be either 0, 1, or 2.

4. The degree of difference between the child's first ending and second ending to the story is to be measured on a five point scale. This is an indication of ideational flexibility exhibited by the child. Place the appropriate score, 0, 1, 3 or 5 in Column 4 of the Summary Table.

The detailed procedure for obtaining the flexibility is as follows:

The evaluation of the qualitative difference between the first and the second ending given to the story will be rated on a five point scale. (Only those children who give two endings will be scored on the qualitative scale.) The more different the second ending from the first the higher the score is on the five point scale.

Of necessity some judgments of a rather subjective nature must be made. Following are several examples of scoring for each of the five point positions:

0 Point: No second ending is given.

1 Point: The first and second answer are virtually identical. Nothing of substance is changed from one ending to the other.

For example:

She went shopping.	1st ending
She could have been at the grocery store.	2nd ending
Be at the store.	1st ending
She went to the store.	2nd ending

She went to town. 1st ending

She went to the village. 2nd ending

To the store. 1st ending

She might have gone to the store to get some groceries. 2nd ending

3 Points: There is one small difference between the first and the second answer; one small feature can be distinguished between the answers.

Examples:

Maybe he went to the store to look for her. He couldn't find her. 1st ending

Maybe he ran out to the woods to look for her. 2nd ending

Probably she ran away. 1st ending

Probably she was out shopping. 2nd ending

She could have gone over to her neighbors and talked. 1st ending

She could have been to the store and she thought she would be home by the time her little boy got home. 2nd ending

To the store. 1st ending

She got killed. 2nd ending

5 Points: The difference between the two endings is strongly pronounced by having many different elements.

She might have been out in the garage and maybe it was his birthday and she wanted to surprise him. 1st ending

She might have fallen over a chair and had to go to the hospital to get stitches. 2nd ending

The Summary Table for the Finish the Story Technique is shown on the next page.

SUMMARY TABLE FOR "FINISH THE STORY"

School _____ Tested: Fall ____

Grade _____ Spring ____

Examiner _____ Year ____

Name of Child	1	2	3	4
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

Legend:

Column 1: Number of words in first answer
2: Number of words in second answer
3: Number of answers (either 0, 1, or 2)
4: Flexibility score (0, 1, 3 or 5)

B

MONTHLY SURVEY
ON
PROJECT RELATED ACTIVITIES

Name_____

Date_____

The purpose of this survey is to determine how much time and effort have been given by each teacher to the activities that are related to Project ACT each month. Please be as accurate as you can in providing your answers to the questions and turn in to the Project secretary on or before the last day of the month.

1. Number of lesson plans that you developed and tried.

	Developed	Actually Tried
BASICS	_____	_____
TABA	_____	_____
Other	_____	_____

2. List all the lesson plans that you actually tried out in the classroom. Using a five-point scale, rate the lesson plan in terms of its structure, content, materials used, etc. Place a check mark under the appropriate column to indicate whether you have submitted each lesson plan either to the in-service instructor (Mr. Frost or Mrs. Dietlin) or the project office (Mrs. Forrest) or both.

Sequence or Process/Strategy	Quality	Submitted to: Instructor	Project Office
(1)			
(2)			
(3)			
(4)			
(5)			
(6)			
(7)			
(8)			
(9)			
(10)			

(11)
(12)
(13)
(14)
(15)
(16)
(17)
(18)
(19)
(20)

3. List all the project related activities that you performed, e.g. participating in in-service, making a presentation to the visitors, making a video tape or audio tape, conference, etc.

Activities	Time Spent
(1)	
(2)	
(3)	
(4)	
(5)	
(6)	
(7)	
(8)	
(9)	
(10)	

4. List all the activities that you performed to help children improve their thinking skills of any kind either by a formal or an informal instruction.

Activities	Time Spent
(1)	
(2)	
(3)	
(4)	
(5)	
(6)	
(7)	
(8)	
(9)	
(10)	

5. Comment:

APPENDIX C

Raw Scores on Tests

PROJECT SCHOOL

GROUP 0-0-K

TEST YEAR SUB-TEST	CAT 1972-73
STUDENT	
1	127
2	127
3	103
4	98
5	131
6	124
7	111
8	94
9	140
10	108
11	96
12	98
13	144
14	127
TOTAL	1628
N	14
MEAN	116.29

PROJECT SCHOOL

GROUP 0-K-1

TEST YEAR SUB-TEST	CAT 1971-72	CAT 1972-73
STUDENT		
1	110	128
2	118	144
3	98	92
4	110	113
5	125	108
6	94	114
7	113	110
8	98	123
9	103	123
10	108	117
11	107	127
12	110	121
13	92	88
14	112	123
15	107	98
16	95	104
17	92	106
18	88	106
19	113	118
20	124	113
21	107	103
22	108	114
23	110	125
24	80	110
25	82	74
26	103	109
27	98	102

Project School, Group C-K-1 (Continued)

28	84	87
29	102	119
30	105	126
31	96	98
32	109	121
33	150	147
34	100	111
35	98	110
36	94	102
37	88	117
38	105	104
39	150	127
40	125	126
41	105	102
42	105	123
TOTAL	4421	4733
N	42	42
MEAN	105.26	112.69

PROJECT SCHOOL

GROUP K-1-2

TEST YEAR SUB-TEST	CAT 1970-71	CAT 1971-72	CAT 1972-73
STUDENT			
1	95	98	88
2	106	101	107
3	96	94	94
4	98	95	97
5	89	93	87
6	105	117	98
7	104	102	92
8	103	97	98
9	112	127	107
10	125	122	117
11	129	113	123
12	120	115	95
13	122	101	102
14	124	150	131
15	99	106	105
16	129	141	119
17	95	100	87
18	108	103	95
19	94	102	100
20	111	115	106
21	98	109	89
22	113	118	111
23	108	112	108
24	109	130	117
25	96	94	104
26	137	99	117
27	120	127	106

Project School, Group K-1-2 (Continued)

28	127	115	127
29	106	102	108
30	95	90	91
31		122	102
32		96	107
33		117	130
34		116	111
35		122	106
36		123	136
37		100	102
38		106	123
39		125	114
40		134	125
41		142	131
42		99	90
43		115	104
44		92	73
45		117	111
46		110	109
47		130	124
48		126	111
49		111	106
50		132	115
51		127	117
52		122	101
53		87	85
TOTAL	3273	5959	5659
N	30	53	53
MEAN	109.10	112.43	106.77

PROJECT SCHOOL

GROUP 1-2-3

TEST	CAT		LTIT			SAI	
YEAR	1970-71	1971-72	1972-73			1972-73	
SUB-TEST			V	N	T	T	S
STUDENT							
1	91	88	76	83	80	3	1
2	104	98	75	92	84	-6	5
3	94	84	80	84	82	1	0
4	117	104	108	124	116	4	8
5	111	108	96	104	100	10	17
6	121	107	70	107	89	6	-8
7	113	101	98	89	94	-3	-1
8	108	106	92	99	96	2	5
9	108	107	80	99	90	8	5
10	130	122	96	96	96	-2	4
11	114	98	108	94	101	7	3
12	84	84	60	79	70	10	5
13	130	109	116	122	119	11	13
14	88	96	71	92	82	-1	-2
15	103	103	92	89	91	-1	3
16	115	108	87	99	93	4	5
17	115	104	100	110	105	11	6
18	104	87	88	79	84	11	9
19	133	103	97	121	109	11	12
20	108	98	96	105	101	0	2
21	104	95	88	95	92	5	6
22	102	92	94	105	100	13	7
23	96	90	79	86	83	8	16
24	97	91	86	125	106	9	12
25	87	90	73	66	70	5	15
26	85	89	78	86	82	7	-1
27	103	113	106	113	110	12	19

Project School, Group 1-2-3 (Continued)

28	84	86	90	107	99	15	15
29	94	97	81	101	91	6	4
30	139	128	106	113	110	13	19
31	123	122	102	113	108	14	12
32	102	98	90	87	89	4	2
33	106	84	78	90	84	3	-1
34	107	110	94	100	97	3	6
35	117	112	95	104	100	5	4
36	112	120	102	123	113	10	15
37	116	91	63	95	79	6	0
38	111	104	88	101	95	7	0
39	94	82	77	100	89	6	2
40	119	124	104	118	111	12	13
41	92	90	88	98	93	2	2
42		89	97	84	91	1	-1
43		93	79	86	83	-6	-1
44		84	65	81	73	4	-2
45		90	61	95	78	0	-2
46		100	89	108	99	0	7
47		106	73	97	85	8	-1
48		87	88	101	95	-4	-4
49		127	120	131	126	6	7
50		101	87	95	91	7	6
51		86	68	89	79	5	-6
52		96	85	93	89	1	3
53		91	72	100	86	4	-1
54		114	101	121	111	11	8
55		104	99	108	104	9	13
56		120	99	115	107	12	13
57		98	88	91	90	-6	-12
58		108	119	114	117	13	12
59		100	84	97	91	6	9
TOTAL	4381	5917	5222	5899	5578	322	307
N	41	59	59	59	59	59	59
MEAN	106.85	102.29	88.51	99.98	94.54	5.46	5.20

PROJECT SCHOOL

GROUP 2-3-4

TEST		LTIT			SAI		SAI			STEP	
YEAR		1971-72			1971-72		1972-73			1972-73	
SUB-TEST	V	N	T	T	S	T	S	SC	SS		L
STUDENT											
1	92	88	90	-3	-2	8	7	247	236		270
2	85	101	93	-2	-4	-13	-8	256	238		264
3	80	95	88	-4	-3	-6	6	248	238		256
4	101	113	107	3	-1	-1	-5	242	237		257
5	115	122	119	13	9	16	12	264	249		279
6	82	99	91	5	0	-5	-10	246	249		265
7	133	141	137	13	12	17	15	261	259		288
8	82	99	91	-2	3	-1	3	249	238		263
9	94	107	101	5	8	10	8	243	234		256
10	93	111	102	8	4	5	8	243	238		263
11	115	113	114	7	7	2	11	237	239		265
12	70	82	76	3	5	8	1	237	238		252
13	100	93	97	-4	2	10	8	243	241		255
14	92	124	108	-2	-5	5	4	249	238		254
15	104	100	102	15	11	2	-2	245	234		257
16	98	113	108	-6	-2	-2	-3	249	248		265
17	66	80	73	-8	-3	6	1	232	235		258
18	102	117	110	6	13	14	13	260	253		269
19	72	94	83	3	6	-3	2	250	228		263
20	101	117	109	9	12	8	13	247	246		266
21	104	108	106	15	5	12	10	247	249		262
22	100	106	103	4	9	13	16	257	248		280
23	98	107	103	8	6	8	8	257	245		253
24	89	100	95	5	-2	3	2	239	233		246
25	113	110	112	13	11	16	10	273	255		286
26	92	95	94	7	7	6	4	235	236		252
27	59	78	69	0	1	10	11	226	232		244

Project School, Group 2-3-4 (Continued)

28	92	96	94	7	7	6	15	258	243	263
29	93	109	101	2	5	3	4	250	228	263
30	99	130	113	8	10	10	9	253	235	273
31	72	86	79	0	-2	11	15	250	228	263
32	62	75	69	4	-1	3	12	226	229	253
33	87	91	89	0	-3	6	6	256	230	251
34	103	107	105	9	7	9	16	259	251	271
35	95	110	103	10	3	7	10	250	242	253
36	109	131	120	4	10	11	9	263	255	265
37	98	108	103	7	6	7	3	253	242	278
38	90	94	92	8	4	10	7	253	244	263
TOTAL	3532	3950	3749	170	155	231	251	9453	9142	9984
N	38	38	38	38	38	38	38	38	38	38
MEAN	92.95	103.95	98.66	4.47	4.08	6.08	6.61	248.76	240.58	262.74

PROJECT SCHOOL

GROUP 3-4-5

TEST	LTIT						SAI				STEP					
YEAR	1970-71			1972-73			1971-72		1972-73		1971-72			1972-73		
SUB-TEST	V	N	T	V	N	T	T	S	T	S	SC	SS	L	SC	SS	L
STUDENT																
1	99	82	91	84	90	87	-2	1	6	5	234	227	248	235	237	247
2	83	67	75	83	105	94	5	6	5	4	243	237	259	244	249	262
3	94	84	89	99	102	101	5	14	13	8	249	231	251	254	244	264
4	133	132	133	108	128	118	-3	1	2	8	259	255	271	276	273	293
5	92	96	94	101	114	108	9	7	9	10	247	238	258	258	248	272
6	98	87	93	95	111	103	8	8	5	6	230	236	253	242	240	267
7	74	66	70	93	96	95	3	6	5	4	247	227	253	244	248	266
8	113	116	115	115	128	122	8	7	3	2	275	256	270	279	262	281
9	97	95	96	102	94	98	4	5	4	4	256	232	258	260	243	264
10	116	117	117	109	114	112	10	13	10	5	253	245	275	261	254	279
11	97	97	97	99	113	106	1	2	7	6	246	239	244	257	247	259
12	90	85	88	104	110	107	4	10	2	13	250	244	263	279	268	278
13	103	96	100	91	109	100	6	4	5	0	239	235	252	248	237	266
14	94	102	98	102	113	108	11	5	11	7	246	238	255	250	261	257
15	75	101	88	84	98	91	6	3	9	9	232	226	253	238	240	264
16	93	117	105	91	116	104	5	1	10	4	239	237	252	252	248	260
17	99	102	101	90	108	99	12	7	9	2	247	237	256	247	246	269
18	94	104	99	122	114	118	3	3	10	15	254	241	262	255	246	261
19	74	87	81	86	94	90	4	4	10	9	243	231	242	242	232	248
20	89	102	96	94	106	100	13	14	4	4	250	244	254	245	248	268
21	104	106	105	121	119	120	4	8	11	13	247	253	268	259	252	282
22	78	67	73	95	106	101	13	0	13	4	245	236	247	252	248	268
23	73	70	72	76	99	88	11	6	5	8	235	236	248	227	232	257
24	112	137	125	79	127	120	5	9	13	17	250	245	263	259	259	293
25	89	76	83	89	76	83	6	2	4	10	245	233	246	243	241	248
26	102	107	105	96	117	107	6	7	11	11	226	230	246	253	240	271
27	98	110	104	98	103	101	13	12	12	16	247	241	270	260	249	276
28	90	106	98	92	111	102	-8	-3	-3	9	230	230	252	247	249	270
29	110	121	116	120	119	120	3	13	18	19	261	252	264	267	261	288
30	93	85	89	86	106	97	8	4	8	8	238	233	245	239	243	257

Project School, Group 3-4-5 (Continued)

	LTIT						SAI				STEP					
	1970-71			1972-73			1971-72		1972-73		1971-72			1972-73		
	V	N	T	V	N	T	T	S	T	S	SC	SS	L	SC	SS	L
31	95	80	88	95	90	93	12	6	10	7	249	243	253	247	247	267
32	114	119	117	113	131	122	13	12	13	19	250	248	259	257	251	278
33	86	113	100	98	109	104	-2	2	12	9	230	238	257	246	236	272
34				98	119	109	0	-3	4	-5	258	244	260	255	253	267
35				82	103	93	6	10	5	14	240	239	257	248	246	253
36				91	115	103	4	-4	11	4	246	241	261	271	266	276
37				74	85	80	-1	3	10	3	234	234	248	239	236	264
38				96	104	100	-4	4	0	6	247	238	258	253	246	263
39				119	127	123	9	12	12	6	271	255	266	262	263	275
40				104	100	102	9	14	6	7	252	250	259	253	257	279
41				112	123	118	7	2	11	7	248	243	264	258	258	279
42				109	113	111	8	2	13	3	251	244	258	259	248	268
43				102	114	108	8	8	2	9	257	241	258	237	244	269
44				85	99	92	1	-1	4	-8	234	235	248	252	253	265
45				86	92	89	3	2	1	-3	244	226	245	250	244	257
46				80	108	94	3	9	9	13	223	226	234	248	246	259
47				71	82	77	7	5	2	1	230	230	228	231	233	247
48				86	101	94	4	13	7	8	239	231	266	248	236	275
49				95	115	105	4	1	11	15	251	243	263	259	256	264
50				80	87	84	8	7	8	4	234	231	251	243	236	257
51				117	132	125	14	12	17	22	259	246	266	261	262	284
52				93	113	104	8	14	7	7	244	230	255	243	241	260
TOTAL	3151	3232	3201	4990	5608	5330	294	309	406	388	12754	12401	13292	13092	12903	13913
N	33	33	33	52	52	52	52	52	52	52	52	52	52	52	52	52
MEAN	95.49	97.94	97.00	95.96	107.85	102.50	5.65	5.94	7.81	7.46	245.27	238.48	255.62	251.77	248.13	267.56

COMPARISON SCHOOL

GROUP O-O-K

TEST YEAR SUB-TEST	CAT 1972-73
STUDENT	
1	103
2	112
3	103
4	120
5	114
6	115
7	80
8	99
9	80
10	124
11	122
12	114
13	76
14	89
TOTAL	1451
N	14
MEAN	103.64

COMPARISON SCHOOL

GROUP O-K-1

TEST YEAR SUB-TEST	CAT 1971-72	CAT 1972-73
STUDENT		
1	104	104
2	119	115
3	130	104
4	98	108
5	112	100
6	109	114
7	110	106
8	109	103
9	119	115
10	114	114
11	95	98
12	84	92
13	94	94
14	104	114
15	112	102
16	146	136
17	108	118
18	92	90
19	100	115
20	103	86
21	91	113
22	93	105
23	113	123
24	98	106
25	91	106
26	127	108
27	110	100

Comparison School, Group O-K-1 (Continued)

28	114	120
29	115	105
30	91	74
31	87	101
32	105	117
33	103	114
34	109	124
35	109	113
36	102	97
37	112	107
38	108	108
39	130	119
40	124	123
41	84	82
42	135	127
43	103	119
44	108	123
45	95	102
TOTAL	4819	4864
N	45	45
MEAN	107.09	108.09

COMPARISON SCHOOL

GROUP K-1-2

TEST YEAR SUB-TEST STUDENT	CAT 1970-71	CAT 1971-72	CAT 1972-73
1	111	120	121
2	93	84	84
3	88	96	99
4	91	97	98
5	110	124	110
6	78	90	92
7	110	113	108
8	85	83	87
9	95	91	95
10	104	113	108
11	93	97	95
12	98	86	97
13	80	88	87
14	108	99	106
15	106	101	99
16	132	136	119
17	103	94	98
18	122	104	116
19	108	102	108
20	96	99	105
21	109	99	101
22	126	117	125
23	103	120	106
24	94	89	92
25	100	104	94
26	117	118	111
27	127	102	107
28	110	96	123
29	112	89	92
30	101	88	89

Comparison School, Group K-1-2 (Continued)

31	122	122	118
32	120	117	121
33	91	97	99
34	120	111	113
35	108	103	94
36	108	115	106
37	114	130	104
38	108	115	108
39	120	123	105
40	122	132	118
41	77	84	82
42		76	74
43		123	113
44		120	121
45		113	109
46		88	85
47		109	108
48		94	96
TOTAL	4320	5011	4946
N	41	48	48
MEAN	105.37	104.40	103.04

COMPARISON SCHOOL

GROUP 1-2-3

TEST	CAT		LTIT				
YEAR	1970-71	1971-72	1972-73				
SUB-TEST			V	N	T	T	S
STUDENT							
1	80	90	62	81	72	2	2
2	114	108	91	83	87	-1	2
3	90	94	59	79	69	2	-2
4	120	114	87	88	88	16	14
5	119	116	97	122	110	0	2
6	96	103	93	88	91	-6	-6
7	114	123	131	110	121	4	5
8	100	86	63	70	67	-4	5
9	90	87	74	82	78	-9	-6
10	120	117	105	133	119	1	-2
11	97	87	88	97	93	0	-2
12	131	120	123	102	113	7	10
13	100	103	81	83	82	7	-1
14	131	114	128	117	123	2	6
15	94	104	93	79	86	-3	4
16	105	131	125	125	125	10	8
17	114	103	70	78	74	-4	-5
18	127	121	106	113	110	5	3
19	97	99	92	95	94	-3	5
20	97	101	93	94	94	12	2
21	102	89	93	95	94	5	6
22	143	135	135	134	135	-9	-3
23	103	106	89	92	91	-5	2
24	74	93	89	84	87	6	10
25	94	93	81	96	89	9	8
26	109	96	111	121	116	-5	0
27	100	96	94	116	105	3	9

Comparison School, Group 1-2-3 (Continued)

28	117	110	110	101	106	8	-5
29	110	122	117	130	124	8	13
30	100	107	107	94	101	-6	6
31	91	96	96	95	96	-6	6
32	102	108	104	125	115	4	2
33	108	106	103	113	108	-7	4
34	88	86	103	78	91	-2	-5
35	120	101	119	121	120	-2	1
36	111	113	113	115	114	-1	3
37	112	99	111	103	107	5	4
38	91	94	78	90	84	-4	3
39	92	101	102	111	107	3	-1
40	86	90	88	98	93	5	8
41		97	74	100	87	-5	-5
42		109	79	86	83	8	4
43		109	95	119	107	-3	-10
TOTAL	4189	4477	4152	4336	4256	47	104
N	40	43	43	43	43	43	43
MEAN	104.73	104.12	96.56	100.84	98.98	1.09	2.42

COMPARISON SCHOOL

GROUP 2-3-4

TEST		LTIT		SAI		SAI			STEP	
YEAR		1971-72		1971-72		1972-73			1972-73	
SUB-TEST	V	N	T	T	S	T	S	SC	SS	L
STUDENT										
1	96	100	98	9	7	5	6	259	254	264
2	94	89	92	8	12	11	12	258	251	266
3	124	136	130	12	12	13	13	267	262	286
4	82	98	90	0	0	2	0	245	245	252
5	116	125	121	10	9	-2	-1	269	268	294
6	88	102	95	6	8	9	9	253	252	280
7	93	79	86	-6	-2	2	10	250	243	252
8	112	107	110	13	-3	13	11	271	269	280
9	75	93	84	-2	7	11	17	239	238	265
10	72	88	80	8	-1	-1	6	256	243	267
11	101	105	103	6	-4	10	2	260	251	278
12	110	112	111	6	-3	11	-1	269	260	275
13	103	97	100	7	-3	1	8	245	243	259
14	94	113	104	7	5	-4	4	249	250	260
15	99	103	101	9	2	16	10	245	246	284
16	98	113	106	8	-3	12	-2	259	254	275
17	112	120	116	9	4	11	2	257	262	270
18	64	93	79	-1	2	3	0	240	237	269
19	63	82	73	7	2	0	-1	245	241	261
20	88	98	93	5	6	-7	3	257	246	267
21	113	121	117	15	3	11	7	264	251	275
22	85	92	89	-2	4	-1	0	246	243	270
23	71	95	83	3	2	-5	2	232	229	257
24	79	82	81	7	3	-5	-2	237	238	267
25	123	104	114	5	0	8	10	262	251	271
26	101	125	113	14	5	6	9	262	243	264
27	111	109	110	12	15	12	22	264	258	274

Comparison School, Group 2-3-4 (Continued)

28	104	96	100	8	3	13	8	260	246	276
29	121	127	124	10	18	11	12	256	258	269
30	140	148	144	12	12	12	20	271	271	294
31	122	124	123	0	2	1	10	261	252	263
32	125	130	128	11	10	11	14	266	257	288
33	118	121	120	10	11	11	12	266	260	270
34	117	119	118	14	15	10	14	266	256	288
35	84	99	92	-3	-5	-5	15	249	245	263
36	111	124	118	9	-1	11	11	267	254	275
37	94	99	97	12	6	13	3	247	247	251
38	110	111	111	14	6	13	12	263	247	271
TOTAL	3813	4079	3954	272	166	231	287	9732	9511	10290
N	38	38	38	38	38	38	38	38	38	38
MEAN	100.34	107.34	104.05	7.16	4.37	6.08	7.55	256.11	250.29	270.79

COMPARISON SCHOOL

GROUP 3-4-5

TEST TEST	SAI		SAI			LTIT			LTIT			STEP			STEP	
YEAR	1971-72		1972-73			1970-71			1972-73			1971-72			1972-73	
SUB-TEST	T	S	T	S	V	N	T	V	N	T	SC	SS	L	SC	SS	L
STUDENT	T	S	T	S	V	N	T	V	N	T	SC	SS	L	SC	SS	L
1	-1	2	6	6	93	91	92	90	94	92	226	231	253	251	234	262
2	13	12	9	12	89	108	99	112	112	112	258	248	260	263	257	281
3	10	11	12	14	89	97	93	101	105	103	251	240	252	256	246	261
4	9	7	15	18	122	123	123	130	120	125	257	250	266	276	271	288
5	8	-3	1	9	112	96	104	112	99	106	244	246	265	258	251	272
6	10	5	8	7	84	115	100	101	113	107	253	248	266	259	255	278
7	-2	6	-4	3	69	70	70	87	94	91	243	230	249	249	249	269
8	8	10	8	14	78	99	89	91	103	97	234	231	249	239	235	267
9	10	6	15	15	102	92	97	105	92	99	245	242	253	251	249	261
10	13	16	-3	3	88	89	89	100	101	101	246	238	263	249	240	265
11	13	16	3	10	102	124	113	100	121	111	252	248	260	267	255	274
12	5	9	2	11	90	95	93	106	106	106	252	244	252	255	257	266
13	10	6	10	2	103	98	101	106	102	104	249	243	265	262	258	273
14	6	-4	12	7	92	100	96	114	107	111	263	244	265	262	266	271
15	6	13	13	16	107	109	108	106	125	116	250	244	266	261	257	279
16	13	14	14	12	104	100	102	103	114	109	247	237	264	263	249	270
17	10	13	12	17	119	114	117	119	123	121	257	251	267	259	261	279
18	2	0	7	3	99	110	105	111	126	119	253	247	260	260	252	268
19	-1	5	15	12	98	102	100	103	107	105	249	245	262	261	258	266
20	11	7	14	17	104	112	108	103	125	114	246	246	271	256	256	273
21	12	5	9	8	104	106	105	104	109	107	258	247	275	259	257	257
22	4	3	5	11	88	95	92	120	128	124	266	252	260	276	263	274
23	9	6	5	7	91	120	106	101	108	105	251	241	262	259	249	270
24	0	2	1	8	79	102	91	96	104	100	232	231	244	245	234	260
25	-3	6	-13	1	67	71	69	79	88	84	238	232	251	251	243	265
26	8	3	-3	-1	99	113	106	97	86	92	239	235	249	239	234	249
27	14	9	12	3	77	86	82	102	99	101	240	233	246	251	243	257

Comparison School, Group 3-4-5 (Continued)

28	-2	5	-10	10	79	108	94	92	97	95	257	250	266	245	243	255
29	13	12	11	12	99	106	103	101	109	105	247	231	264	251	254	269
30	7	-4	2	0	96	128	112	103	124	114	252	251	271	273	265	286
31	4	10	6	8	90	113	102	104	180	112	250	238	257	248	246	264
32	-4	3	-4	14	78	89	84	108	114	111	235	236	258	244	238	266
33	10	2	11	9	84	80	82	85	106	96	223	228	251	241	240	253
34	5	4	10	15	63	89	76	78	99	89	230	237	247	231	236	255
35	6	11	3	1	90	94	92	108	114	111	238	241	252	251	245	253
36	5	6	10	8	83	103	93	91	97	94	237	232	252	231	237	261
37	12	13	10	19	93	110	102	95	123	109	226	230	253	244	243	261
38	12	8	13	12	77	87	82	83	90	87	238	238	260	251	242	278
39	5	11	-3	7	933	106	100	91	99	95	243	231	266	244	235	271
40	6	1	14	7	94	109	102	99	113	106	247	233	253	253	249	255
41	15	16	11	17	89	96	93	104	107	106	244	236	259	247	248	261
42	11	4	10	15	94	92	93	103	115	109	248	242	267	258	254	270
43	8	9	15	15	117	110	114	122	116	119	260	252	279	263	266	282
44	14	7	6	10	88	88	88	91	95	93	238	236	252	249	243	252
45	5	6	11	9	93	101	97	92	106	99	237	230	230	243	241	249
46	10	4	-11	3				80	83	82	232	227	249	238	239	259
47	10	10	9	20				102	106	104	252	241	264	266	253	274
48	14	6	15	15				115	113	114	255	249	267	248	246	270
49	6	10	8	4				84	91	88	240	237	252	242	237	261
50	3	4	3	6				97	99	98	243	238	252	233	237	252
51	16	19	14	19				107	105	106	254	246	261	255	257	272
52	11	9	9	8				108	117	113	250	243	258	255	246	267
TOTAL	399	371	358	508	4149	4546	4358	5242	5629	5417	12775	12477	13435	13141	12919	13851
N	52	52	52	52	45	45	45	52	52	52	52	52	52	52	52	52
MEAN	7.67	7.13	6.88	9.77	92.20	101.02	96.84	100.81	108.25	104.17	245.67	239.94	258.37	252.71	248.44	266.37

APPENDIX D

Project ACT Newsletter

NEWSLETTER

PROJECT ACT

TITLE III, ESEA, OHIO DEPARTMENT OF EDUCATION
HIGHLAND PARK ELEMENTARY SCHOOL
SOUTH-WESTERN CITY SCHOOL DISTRICT
Martin L. Stahl, Ph.D., Superintendent
C. Y. Ahn, Ph.D., Project Director
May 10, 1973

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The Project to Advance Critical Thinking is a Federally funded project in its last of three years in operation at the Highland Park Elementary School. The major purpose of the project is to provide children with educational experiences which help them develop effective thinking skills.

The teachers have learned and are utilizing with children two thoroughly tested teaching techniques. These techniques are designed to encourage children to think and formulate an answer rather than just give a yes/no response. One of the programs is called BASICS (Building and Applying Strategies for Initial Cognitive Skills) and the other program is called Hilda Taba Teaching Strategies. Both programs were developed by the Institute for Staff Development in Miami, Florida.

The BASICS program includes questioning techniques for developing seventeen foundation thinking skills. These are: observing, recalling, noticing differences, noticing similarities, ordering, grouping, concept labeling, classifying, concept testing, inferring causes, inferring effects, inferring feelings, concluding, generalizing, questioning, anticipating, and making choices.

The Hilda Taba Teaching Strategies Program consists of four general discussion techniques: concept development, interpretation of data, application of generalizations, and interpretation of feelings, attitudes and values. Each strategy is designed for analyzing data in a specific way.

An environment which provides the opportunity for children to utilize and practice thinking skills necessarily accompanies these techniques. Small group and individual work to allow active involvement is emphasized at Highland Park.

APPENDIX E

Lesson Plan Book I (Taba)
Lesson Plan Book II (Taba)
Lesson Plan Book III (BASICS)

Having learned these strategies, teachers at Highland Park are more aware of the necessity for planning lessons to meet the goals they wish the children to accomplish. They also realize that the content of the lesson must be within the understanding of the children. Most of the teachers are asking a much greater percentage of open questions than those that require a specified answer. Children, when given the opportunity, can learn to make sound, justifiable decisions and choices. However achievement is a continuous process, taking longer for some than for others.

It seems that a child's innate ability for learning to read does not necessarily dictate his ability to utilize thinking skills. Some of our children who are developing more slowly with reading are successful with the thinking skills. Our children in the slow learning classes can also utilize these skills successfully.

Several of the parents have become quite interested and have requested and are receiving assistance in learning some of the questioning techniques so they can use them at home. This is being accomplished through the cooperation of the local Parent Teacher Association.

Some of the other schools in the district have requested and received information and training in the use of some of the questioning techniques, so the project content is being extended to other schools.

We have video tapes available and visitors can be accommodated at the school to find out more about the project. Also a resource file of lesson plans developed by the teachers is accessible to anyone interested. Arrangements for your visitation can be made by letter or telephone.

For further information, contact:

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South-Western City Schools
3708 S. Broadway
Grove City, Ohio 43123
(614) 875-2318

-or-

Dr. Arthur Steller, Principal
Highland Park Elementary School
South-Western City Schools
2525 Hoover Road
Grove City, Ohio 43123
(614) 875-1025

TABA

LESSONS

Book I

K -- 5

1971--72

TABA LESSONS K-5
1971-72

MATH

Topic Symmetry

Level Grade 1

Teacher Diann Hollett

Strategy Concept Attainment

Topic Mathematics (repeated addition = multiplication)

Level Grade 3

Teachers Elliott and Baker

Strategy Interpretation of Data

Topic Mathematics: Multiplication

Level Grade 3

Teacher Ethel Elliott

Strategy Concept Attainment

Topic Mathematics--Even-Odd

Level Grade 4

Teacher John Berning

Strategy Concept Attainment

SCIENCE

Topic Community Landscape

Level Grade 4

Teacher Barbara McClure

Strategy Concept Development

Science Continued

Topic Science (To strengthen the concept of open and closed circuit.

Level Grade 4

Teacher John Berning

Strategy Concept Attainment

Topic Science--Environment (City Park)

Level Grade 3

Teacher John Berning

Strategy Interpretation of Data

Topic Temperature

Level Grade 1

Teacher Diann Hollett

Strategy Concept Development

Topic Science--Describing

Level Grade 2

Teacher John Berning

Strategy Concept Development

Topic Human Body

Level Grade 4

Teacher Barbara McClure

Strategy Concept Development

Science Continued

Topic Science--AAAS (To verify, modify, or extend the generalization "For each vial full of a solid placed into a container of water, the water level moves upward.)

Level Grade 2

Teacher John Berning

Strategy Application of Generalization

Topic Science AAAS Part C, Ex. B

Level Primary

Teacher Nancy Hurd

Strategy Concept Development

LANGUAGE ARTS

Topic Language Arts: Descriptive Words

Level Grade 4 (could be used at higher or lower grade level)

Teachers Abbey and Berning

Strategy Concept Development

Topic Literature--Friends vs. Enemies

Level Primary

Teacher Nancy Hurd

Strategy Analysis of Values

Topic (Listening) Reading--Comprehension

Level Grade 2

Teacher Nancy Hurd, John Berning

Strategy Analysis of Values

Topic Literature (To analyze values evident in Tico.)

Level Primary

Teacher Nancy Hurd

Strategy Analysis of Values

Topic Comparison of main characters in two books

Level Grade 5

Teacher Nancy Conrado

Strategy Interpretation of Data

Topic Characterization

Level Grade 4

Teacher Barbara McClure

Strategy Interpretation of Data

Topic Critical Reading

Level Primary

Teacher Nancy Hurd

Strategy Interpretation of Data

Topic Setting--Critical Reading

Level Grades 4 and 5

Teacher Darrel Timmons

Strategy Application of Generalizations

Topic Literature (To give children an opportunity to infer and support their inferences about the feelings of mothers and children lost from each other.

Level Grades 4,5

Teachers Barbara McClure, Shirley Abbey, Nancy Conrado

Language Arts Continued

Topic Critical Reading and Social Science (Behavior) Provide an opportunity for children to make and support inferences about causes and effects of Carol's behavior and to arrive at a valid generalization about it.

Level Grade 5

Teacher Darrel Timmons

Strategy Interpretation of Data

Topic Critical Reading

To evaluate the children's understanding of the concepts of stereotype and realistic story characters.

Level Grade 4

Teacher Shirley Abbey

Strategy Concept Attainment

Topic Critical Reading

To develop a generaliztion similar to "Honesty is the best policy."

Level Grade 4

Teacher Shirley Abbey

Strategy Interpretation of Data

Topic Critical Reading

To compare and contrast two literary versions of the same story and to draw conclusions based upon inferences made about the similarities and differences.

Level Primary

Teacher Nancy Hurd

Strategy Interpretation of Data

Topic Madeline

Level Grade 5

Teachers Nancy Conrado, Darrel Timmons

Strategy Interpretation of Data

Topic One-Syllable Words with Checked Vowel Sound

Level Grade 3

Teacher Ethel Elliott

Strategy Interpretation of Data

Topic Language: Noting Sentence

Level Grade 3

Teachers Ethel Elliott and Sue Baker

Strategy Concept Attainment

Topic Proper Nouns and Common Nouns

Level Grade 4

Teacher Barbara McClure

Strategy Concept Attainment

Topic Dictionary

To clarify and extend children's concept of dictionary uses.

Level Grades 4 and 5

Teachers Abbey, Conrado, McClure

Strategy Concept Development

Topic Word Patterns in Spelling

Level Grade 4

Teacher Shirley Abbey

Strategy Concept Development

Topic Punctuation in Questions, Statements, and Exclamations

Level Grade 4

Teacher Shirley Abbey

Strategy Concept Attainment

Topic Prefixes and Suffixes

Level Grades 4 and 5

Teachers Abbey and Conrado

Strategy Interpretation of Data

Topic Suffixes

Level Grade 4

Teacher Shirley Abbey

Strategy Concept Attainment

Topic Phonics

Level Grade 4

Teacher Shirley Abbey

Strategy Concept Attainment

Topic Literature

Level Grade 3+

Strategy Interpretation of Data

To compare and contrast two literary versions of the same story and to draw conclusions based upon inferences made about the similarities and differences.

SOCIAL STUDIES

Topic Things We Learn With

Level Early First Grade

Teacher Marilyn Callahan

Strategy Concept Development

Topic Attributes of Concrete Objects: Texture and Material and Shapes of Objects

Level Kindergarten

Teacher Carole DePaola

Strategy Concept Development

Topic What is First Grade?

Level Early First Grade

Teacher Diann Hollett

Strategy Concept Development

Topic What People Do in Winter

Level Kindergarten

Teacher Carole DePaola

Strategy Concept Development

Topic Who Am I?

Level Grade 2

Teachers Nancy Hurd, John Berning

Strategy Interpretation of Data

Topic Who Am I?

Level Primary

Teachers Nancy Hurd, John Berning

Strategy Interpretation of Feelings

Topic Who Am I?

Level Primary

Teachers Nancy Hurd, John Berning

Strategy Concept Development

Topic Who Am I?

Level Primary--2nd Grade

Teachers Nancy Hurd, John Berning

Strategy Interpretation of Feelings

Topic China--Social Studies (Chinese/American Children)

Level Primary

Teacher Nancy Hurd

Strategy Interpretation of Data

Topic Social Studies

Level Grade 2

To clarify and extend children's concept of the differences in people.

Teachers Nancy Hurd, John Berning

Strategy Concept Development

Topic Environment

Level Grade 3

Teachers Susan Baker, Ethel Elliott

Strategy Concept Development

Topic Post Office

Level First Grade

Teacher Diann Hollett

Strategy Concept Development

Topic Post Office

Level First Grade

Teacher Marilyn Callahan

Strategy Concept Development

Topic Concept of School

Level Primary Special (EMR)

Teacher Ruby Comer

Strategy Concept Development

Topic Unit on Animals

Level Grade 4

Teacher Shirley Abbey

Strategy Concept Development

Topic The City

Level Grades 4 and 5

Teachers Darrel Timmons, Nancy Conrado, Shirley Abbey, Barbara McClure

Strategy Concept Development

Topic Bank Robbed

Level Grades 4 and 5

Teachers Abbey, Conrado, McClure, Timmons

Strategy Application of Generalizations

Topic North American Indians

Level Grade 5

Teacher Nancy Conrado

Strategy Interpretation of Data

Topic Density of Population

Level Grade 4

Teachers Barbara McClure, Shirley Abbey

Strategy Concept Attainment

Topic Vegetation

Level Grade 4

Teachers Shirley Abbey, Barbara McClure

Strategy Concept Attainment

Topic Discovering Differences

Level Grade 5

Teacher Nancy Conrado

Strategy Interpretation of Data

Topic Discovering Differences SRA Behavior

Level Grade 4

Teachers John Berning and Shirley Abbey

Strategy Application of Generalizations

Topic SRA Human Behavior Unit Individuals and Groups

Level Grade 5

Teachers D. Timmons and N. Conrado

Strategy Interpretation of Data

Topic Differences in People

Level Grade 5

Teacher Darrel Timmons

Strategy Interpretation of Data

Topic Individuals and Groups SRA Social Science Program

Level Grade 5

Teachers Nancy Conrado and Darrel Timmons

Strategy Interpretation of Data

Topic SRA Human Behavior

Level Grade 5

Students will infer and support their inferences about the feelings of the two boys, when one chose to be alone.

Teachers Darrel Timmons and Nancy Conrado

Strategy Interpretation of Feelings

Topic	Individuals and Groups	SRA Social Science Program
Level	Grade 5	
Teachers	Conrado and Timmons	
Strategy	Resolutions of Conflicts	
Topic	Groups and Individuals	Three Types Leadership: Democratic, Authoritarian, Laissez-Faire
Level	Grade 5	
Teachers	Nancy Conrado and Darrel Timmons	
Strategy	Concept Attainment	
Topic	Differences in People	
Level	Grade 4	
Teacher	John Berning	
Strategy	Concept Development	
Topic	Behavior	To clarify the participants' concept of the term "Scientists"; to introduce a unit on studying human behavior.
Level	Grade 4	
Teacher	Shirley Abbey	
Strategy	Concept Development	
Topic	Groups and Individuals	SRA
Level	Grade 5	
Teachers	Nancy Conrado and Darrel Timmons	
Strategy	Concept Development	

Topic Individuals and Groups SRA

Level Grade 5

Teachers Nancy Conrado and Darrel Timmons

Strategy Concept Development

Topic Discovering Differences

Level Grade 5

Teacher Nancy Conrado

Strategy Concept Development

Topic Social Science

Level Grade 4

To evaluate the children's understanding of the concept of heredity and environment.

Teachers John Berning and Shirley Abbey

Strategy Concept Attainment

Topic Indians

Level Grade 5

Teachers Nancy Conrado, Darrel Timmons

Strategy Concept Development

BASIC CONCEPTS

Topic "Hard"

Level Kindergarten

Teacher Carole DePaola

Strategy Concept Attainment

Topic "Smooth"

Level Kindergarten

Teacher Carole DePaola

Strategy Concept Attainment

Topic "Soft"

Level Kindergarten

Teacher Carole DePaola

Strategy Concept Attainment

Topic "Rough"

Level Kindergarten

Teacher Carole DePaola

Strategy Concept Attainment

Topic Similar Attributes of Names (words)

Level Kindergarten

Teacher Carole DePaola

Strategy Concept Development

Topic Cause and Effect Relationships

Level Grade 5

Teacher Darrel Timmons

Strategy Interpretation of Data

Provide an opportunity for children to make and support inferences about causes and effects of the behavior of character in the filmloop.

Topic Causal Relationships

Level Grade 5

Teacher Nancy Conrado

There are various reasons (causes) why the monkey acted the way he did and various effects that his actions had on this particular situation.

Note: These lessons are on file in the Title III office if you would like to use any of them.

CF/pf

A PROJECT TO ADVANCE CRITICAL THINKING

TABA TEACHING STRATEGIES

LESSON PLANS

BOOK II

Highland Park School

ESEA Title III

1972-73

TABA LESSONS K-5
1972-73

MATHEMATICS

Topic: Scale of Miles
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Attainment

Topic: Symmetry
Level: Grade 1
Teacher: Marilyn Massey
Strategy: Concept Attainment

Topic: Equivalence Among Fractions, Cents, Decimals, Percents
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Attainment

SCIENCE

Topic: Observation--Inference
Level: Grade 4-5
Teacher: Barbara McClure
Strategy: Concept Attainment

Topic: The Uses of Water
Level: Grade 3
Teacher: Susan Baker
Strategy: Concept Development

Topic: Weather (Storms)
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Development

Topic: Insects
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Development

Topic: Ecology
Level: Grade 2-3
Teacher: Nancy Hurd
Strategy: Concept Development

Topic: Plants
Level: Grade 5
Teacher: Nancy Conrado
Strategy: Concept Development

LANGUAGE ARTS

Topic: Poetry (Haiku--Cinquain)
Level: Grade 5
Teacher: Nancy Conrado
Strategy: Concept Attainment

Topic: Poetry (Quatrain--Limerick)
Level: Grade 5
Teacher: Nancy Conrado
Strategy: Concept Attainment

Topic: Singular and Plural Nouns
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Attainment

Topic: Singular and Plural Possessives
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Attainment

Topic: Types of Letters (Friendly, Business, Thank-you, Invitation)
Level: Grade 4-5
Teacher: Nancy Conrado, Shirley Abbey
Strategy: Concept Attainment

Topic: Word Usage--Is, Are, Was, Were
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Attainment

Topic: Word Usage--To, Too, Two
Level: Grade 4-5
Teacher: Nancy Conrado, Shirley Abbey
Strategy: Concept Attainment

Topic: Word Usage--Teach, Learn
Level: Grade 4-5
Teacher: Nancy Conrado, Shirley Abbey
Strategy: Concept Attainment

Topic: Word Usage--Sit, Set
Level: Grade 4-5
Teacher: Nancy Conrado, Shirley Abbey
Strategy: Concept Attainment

Topic: Word Usage--Good, Well
Level: Grade 4-5
Teacher: Nancy Conrado, Shirley Abbey
Strategy: Concept Attainment

Topic: Contractions
Level: Grade 4-5
Teacher: Shirley Abbey and Nancy Conrado
Strategy: Concept Attainment

Topic: Apostrophes
Level: Grade 5
Teacher: Nancy Conrado
Strategy: Concept Attainment

Topic: Word Usage-- A, An
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Attainment

Topic: Word Usage--Lay, Lie
Level: Grade 4-5
Teacher: Nancy Conrado and Shirley Abbey
Strategy: Concept Attainment

Topic: Word Usage:Let,Leave
Level: Grade 4-5
Teacher: Shirley Abbey and Nancy Conrado
Strategy: Concept Attainment

Topic: Using "and"
Level: Grade 4-5
Teacher: Shirley Abbey and Nancy Conrado
Strategy: Concept Attainment

Topic: Parts of Speech--Simple and Complete Subjects and Predicates
Level: Grade 4-5
Teacher: Shirley Abbey, Nancy Conrado
Strategy: Concept Attainment

Topic: Parts of Speech--Nouns
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Attainment

Topic: Parts of Speech--Common and Proper Nouns
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Attainment

Topic: Parts of Speech--Nouns and Pronouns
Level: Grade 5
Teacher: Nancy Conrado
Strategy: Concept Attainment

Topic: Parts of Speech--Verbs (Action, To Be)
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Attainment

Topic: Parts of Speech--Verbs (Helping Words)
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Attainment

Topic: Parts of Speech--Concept of Adjectives
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Attainment

Topic: Parts of Speech--Adjectives of Comparison
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Attainment

Topic: Nouns, Adjectives, Adverbs
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Attainment

Topic: Parts of Speech: Adjectives and Adverbs
Level: Grade 5
Teacher: Nancy Conrado
Strategy: Concept Attainment

Topic: Critical Reading (Sounder)
Level: Grade 5
Teacher: Nancy Conrado
Strategy: Interpretation of Data

Topic: Critical Reading--Figurative Language (Metaphors and Similes)
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Attainment

Topic: Critical Reading--Peter's Chair
Level: Grade 3
Teacher: Susan Baker
Strategy: Analysis of Values

Topic: Critical Reading--Biography, Historical Fiction
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Attainment

Topic: Critical Reading--Fantasy
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Attainment

Topic: Critical Reading--Fantasy, Realistic Fiction
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Attainment

Topic: Critical Reading--Fiction, Informational Books
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Attainment

Topic: Literature--Authors and Illustrators
Level: Grade 2
Teacher: Nancy Hurd
Strategy: Concept Development

Topic: Phrases, Sentences, Paragraphs
Level: Grade 5
Teacher: Nancy Conrado
Strategy: Concept Attainment

Topic: Spelling Pattern oy-oi
Level: Grade 3
Teacher: Susan Baker
Strategy: Concept Attainment

Topic: Paragraphs, Phrases, Sentences (Careers: Shopping Center Unit
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Attainment

SOCIAL STUDIES

Topic: Shopping Centers (Careers Unit)
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Development

Topic: Hospital (Careers Unit)
Level: Grade 5
Teacher: Nancy Conrado
Strategy: Concept Development

Topic: The United States--What We Need to Find Out
Level: Grade 5
Teacher: Nancy Conrado
Strategy: Concept Development

Topic: The United States--What We Know
Level: Grade 5
Teacher: Nancy Conrado
Strategy: Concept Development

Topic: Maps
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Attainment

Topic: Magicians--What we Know (Careers Unit)
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Development

Topic: Magicians--What We Need to Find Out (Careers Unit)
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Development

Topic: Bank Workers--What We Know About Them (Careers Unit)
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Development

Topic: Flower Workers--What We Know About Them (Careers Unit)
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Development

Topic: Stock Brokers--What We Know About Them (Careers Unit)
Level: Grade 4
Teacher: Shirley Abbey
Strategy: Concept Development

Topic: Newspaper--What We Know (Careers Unit)
Level: Grade 2-3
Teacher: Nancy Hurd
Strategy: Concept Development

Topic: Newspaper--Concept of a News Story
Level: Grades 2-3
Teacher: Nancy Hurd
Strategy: Concept Development

Topic: Newspaper--What is Found in a Newspaper ?
Level: Grade 5
Teacher: Darrel Timmons
Strategy: Concept Development

Topic: Newspaper--What Happens When Employees Strike ?
Level: Grade 5
Teacher: Darrel Timmons
Strategy: Application of Generalizations

Topic: Ohio--What Should We Find Out ?
Level: Grade 4
Teacher: Shirley Abbey, Lyn Taylor
Strategy: Concept Development

Topic: Workers at School--Needs of Children-Workers-School Atmosphere
Level: Grades 2-3
Teacher: Nancy Hurd
Strategy: Interpretation of Data

Topic: Differences in People
Level: Grade 5
Teacher: Nancy Conrado
Strategy: Interpretation of Data

Topic: The Farm-Changes Over the Past Hundred Years
Level: Grade 4-5
Teacher: Barbara McClure
Strategy: Interpretation of Data

Topic: Work of Eskimos (Careers Unit)
Level: Grade 3
Teacher: Susan Baker
Strategy: Concept Development

Topic: Olympics
Level: Grade 4-5
Teacher: Barbara McClure
Strategy: Concept Development

Topic: Factories in Ohio
Level: Grade 5
Teacher: Darrel Timmons, Barbara McClure
Strategy: Concept Development

Topic: American Indians
Level: Grade 5
Teacher: Nancy Conrado
Strategy: Concept Development

Topic: Observations and Inferences
Level: Grade 4-5
Teacher: Nancy Conrado, Shirley Abbey
Strategy: Concept Attainment

Topic: Norway
Level: Grades 2-3
Teacher: Nancy Hurd
Strategy: Concept Development

Topic: Self-Awareness--Differences in People
Level: Grades 2-3
Teacher: Nancy Hurd
Strategy: Concept Development

ART

Topic: Quality of Art Work
Level: Teachers
Teacher: Nancy Hurd
Strategy: Concept Development

A PROJECT TO ADVANCE CRITICAL THINKING

BASICS
(Building and Applying Strategies for Initial Cognitive Skills)

LESSON PLANS

BOOK III

Highland Park School

ESEA Title III

1971-72, 1972-73

BASICS Lessons

K-5

MATHEMATICS

Topic: Smallest to Largest Numbers (Value)
Content Form: Symbolic
Process: Ordering
Teacher: Mary Ostoich

Topic: Shortest, Tallest, First, Last
Content Form: Representational
Process: Ordering
Teacher: Diann Hollett

Topic: Longest to Shortest
Content Form: Concrete
Process: Ordering
Teacher: Nancy Hurd

Topic: Smallest to Largest, Farthest, Highest
Content Form: Representational
Process: Ordering
Teacher: Rita Bendinelli

Topic: Longest, Shortest, Heaviest, Lightest
Content Form: Concrete
Process: Ordering
Teacher: Marilyn Massey

Topic: Heaviest, Lightest, Largest, Smallest
Content Form: Representational
Sequence: Observing, Noticing Differences, Noticing Similarities, Ordering
Teacher: Nancy Conrado

Topic: Liquid Measures
Content Form: Concrete
Sequence: Observing, Noticing Differences, Noticing Similarities, Ordering
Teacher: Nancy Conrado

Topic: Sets
Content Form: Concrete
Sequence: Grouping, Concept Labeling
Teacher: Mindy Shriver

Topic: Sets and Most, Greatest, Least Members
Content Form: Concrete
Process: Ordering
Teacher: Marilyn Massey

Topic: Differences in Shape and Thickness
Content Form: Concrete
Process: Noticing Differences
Teacher: Susan Baker

Topic: Rectangularity
Content Form: Concrete
Sequence: Classifying, Concept Testing
Teacher: Marilyn Massey

Topic: Shapes
Content Form: Representational
Process: Observing
Teacher: Marilyn Massey

Topic: Geometric Shapes
Content Form: Concrete
Sequence: Observing, Noticing Differences, Noticing Similarities, Grouping, Concept Labeling
Teacher: Marilyn Massey

Topic: Triangles
Content Form: Concrete
Sequence: Observing, Noticing Differences, Noticing Similarities, Labeling, Concept Testing
Teacher: Mindy Shriver

Topic: Number, Value, Size, Weight of Coins
Content Form: Concrete
Process: Ordering
Teacher: Mindy Shriver

Topic: Symmetry
Content Form: Concrete
Sequence: Observing, Noticing Differences, Noticing Similarities, Concept Labeling, Concept Testing//Observing, Noticing Differences, Noticing Similarities, Concept Labeling, Noticing Similarities, Noticing Differences, Classifying
Teach : Inservice Specialists

Topic: Coins
Content Form: Concrete
Sequence: Observing, Grouping, Concept Labeling
Teacher: Marilyn Massey

Topic: Clock
Content Form: Concrete
Process: Observing
Teacher: Marilyn Massey

Topic: Telling Time
Content Form: Representational
Process: Making Choices
Teacher: Nancy Hurd

Topic: Liquid Measures
Content Form: Concrete
Process: Ordering
Teacher: Marilyn Massey

Topic: Numeral Order
Content Form: Symbolic
Process: Ordering
Teacher: Marilyn Massey

Topic: Measures
Content Form: Concrete
Sequence: Observing, Noticing Similarities, Grouping, Labeling
Teacher: Barbara McClure

Topic: Measurement
Content Form: Symbolic
Sequence: Recalling, Inferring Causes, Inferring Effects
Teacher: Barbara McClure

Topic: Measures
Content Form: Concrete
Process: Classifying
Teacher: Lucy Savon

Topic: Fractional Parts
Content Form: Concrete
Sequence: Observing, Noticing Differences, Noticing Similarities, Concept Labeling, Concept Testing//Observing, Noticing Differences, Noticing Similarities, Concept Labeling, Noticing Differences, Noticing Similarities, Classifying// Observing, Noticing Differences, Noticing Similarities, Concept Labeling, Observing, Noticing Similarities, Noticing Differences, Concept Testing, Classifying
Teacher: Nancy Conrado

Topic: Bar Graph--Pictograph
Content Form: Representational
Sequence: Observing, Noticing Differences, Noticing Similarities
Teacher: Nancy Conrado

Topic: Bar Graph
Content Form: Representational
Sequence: Observing, Concept Testing
Teacher: Nancy Conrado

Topic: Geoboards and Shapes
Content Form: Concrete
Sequence: Observing, Noticing Differences, Noticing Similarities
Teacher: Nancy Conrado

SCIENCE

Plants and Flowers

Topic: Plants in Autumn
Content Form: Representational, Symbolic
Process: Recalling
Teacher: Lucy Savon

Topic: Plants Dying
Content Form: Concrete
Process: Inferring Causes
Teacher: Diann Hollett

Topic: Pumpkins, Gourds
Content Form: Concrete
Sequence: Noticing Differences, Noticing Similarities
Teacher: Shirley Abbey

Topic: Flowers (Roses, Tulips)
Content Form: Symbolic
Sequence: Recalling, Noticing Differences, Noticing Similarities, Concluding
Teacher: Nancy Conrado

Topic: Flowers (Trip to a Greenhouse) Careers Unit
Content Form: Symbolic
Sequence: Recalling, Grouping, Concept Labeling, Classifying
Teacher: Nancy Conrado

Topic: Flowers (Trip to a Greenhouse) Careers Unit
Content Form: Symbolic
Sequence: Recalling, Grouping, Concept Labeling, Questioning,
Teacher: Lyn Taylor

Topic: Plants: What We Know
Content Form: Symbolic
Sequence: Recalling, Grouping, Concept Labeling
Teacher: Lyn Taylor

Topic: Plants: Greenhouse
Content Form: Concrete
Process: Questioning
Teacher: Nancy Conrado

Topic: Leaves (AAA-S)
Content Form: Concrete
Process: Observing
Teacher: Ann Carroll

Birds and Animals

Topic: Birds (Goldfinch, Yellow Warbler)
Content Form: Representational
Sequence: Observing, Noticing Differences, Noticing Similarities
Teacher: Darrel Timmons

Topic: Birds (Robin, Bluejay, Cardinal)
Content Form: Representational
Process: Noticing Similarities
Teacher: Mary Ostoich

Topic: Birds
Content Form: Representational
Sequence: Observing, Noticing Differences, Noticing Similarities
Teacher: Ann Horner

Topic: Wild Animals
Content Form: Representational
Process: Noticing Similarities
Teacher: Shirley Abbey

Topic: Animals (Dog, Cat)
Content Form: Symbolic
Sequence: Noticing Differences, Noticing Similarities
Teacher: Mary Ostoich

Topic: Animals (Early Use of)
Content Form: Representational
Process: Observing
Teacher: Shirley Abbey

Topic: Prehistoric Animals
Content Form: Representational
Process: Recalling
Teacher: Susan Baker

Topic: Prehistoric Times (Dinosaurs)
Content Form: Representational
Process: Recalling
Teacher: Susan Baker

Topic: Dinosaurs
Content Form: Representational
Sequence: Observing, Noticing Differences
Teacher: Susan Baker

Topic: Caring for Fish
Content Form: Representational
Process: Inferring Effects
Teacher: Carole DePaola

Seasons

Topic: Four Seasons
Content Form: Representational
Process: Observing
Teacher: Ann Horner

Topic: Spring
Content Form: Concrete
Process: Observing
Teacher: Diann Hollett

Topic: Spring
Content Form: Concrete
Process: Recalling
Teacher: Nancy Hurd

Topic: Spring
Content Form: Concrete
Process: Recalling
Teacher: Diann Hollett

Topic: Signs of Spring
Content Form: Concrete
Process: Recalling
Teacher: Marilyn Massey

Topic: Spring
Content Form: Representational
Sequence: Observing, Classifying
Teacher: Diann Hollett

Topic: Spring Flowers
Content Form: Concrete
Sequence: Observing, Noticing Differences, Noticing Similarities, Concept Testing
Teacher: Carole DePaola

Rocks

Topic: Rocks (Different Kinds, Sizes, Shapes, Textures)
Content Form: Concrete
Sequence: Observing, Noticing Differences, Noticing Similarities, Ordering, Grouping, Concept Labeling, Classifying
Teacher: Brenda Steinhoff

Topic: Rocks (Smooth and Rounded)
Content Form: Concrete
Sequence: Observing, Inferring Causes, Concluding
Teacher: Brenda Steinhoff

Topic: Rocks (If all soft, what might happen?)
Content Form: Symbolic
Process: Anticipating
Teacher: Brenda Steinhoff

Topic: Rocks (If none, what might happen?)
Content Form: Symbolic
Process: Anticipating
Teacher: Brenda Steinhoff

Miscellaneous

Topic: Wheel and Axle
Content Form: Representational
Process: Recalling
Teacher: Shirley Abbey

Topic: Walk in Woods
Content Form: Concrete
Process: Recalling
Teacher: Darrel Timmons

Topic: Pollution
Content Form: Symbolic
Process: Inferring Effects
Teacher: Nancy Hurd

Topic: Weather
Content Form: Concrete
Sequence: Observing, Noticing Differences, Noticing Similarities
Teacher: Marilyn Massey

Topic: First Snowfall
Content Form: Concrete
Sequence: Observing, Recalling
Teacher: Nancy Conrado

Topic: Observation (AAA-S)
Content Form: Concrete
Process: Observing
Teacher: Nancy Conrado

Topic: Observation (Supplement AAA-S)
Content Form: Concrete
Process: Observing
Teacher: Shirley Abbey

Topic: Items in Science Center
Content Form: Concrete
Process: Classifying
Teacher: Carole DePaola

Topic: Opening A Science Center
Content Form: Concrete
Process: Observing
Teacher: Marilyn Massey

Topic: Science Center Items
Content Form: Concrete
Sequence: Observing, Noticing Differences, Grouping, Concept Labeling, Ordering
Teacher: Carole DePaola

Topic: A Sugar Pill in Hot-Cold Water
Content Form: Concrete
Sequence: Observing, Noticing Differences
Teacher: Marilyn Massey

Topic: Popping Popcorn (AAA-S)
Content Form: Concrete
Process: Recalling
Teacher: Marilyn Massey

Topic: Popcorn
Content Form: Concrete
Process: Noticing Differences
Teacher: Diann Hollett

Topic: Objects that Float in Water
Content Form: Concrete
Sequence: Observing
Teacher: Mary Ostoich

Topic: Boats
Content Form: Symbolic
Sequence: Recalling, Grouping, Labeling
Teachers: Ethel Elliott, Susan Baker

Topic: Steamship-Jet Liner-Station Wagon
Content Form: Representational
Sequence: Noticing Differences, Noticing Similarities
Teacher: Rita Bendinelli

LANGUAGE ARTS

Language Development

Topic: Language Development: Glass, Can, Cup
Content Form: Concrete
Process: Observing
Teacher: Susan Baker

Topic: Language Development: Christmas Tree
Content Form: Concrete
Sequence: Observing, Concept Testing
Teacher: Marilyn Massey

Topic: Language Development: Santa Claus
Content Form: Symbolic
Process: Concept Testing
Teacher: Marilyn Massey

Topic: Language Development: Scale, Paint Brush, Purse
Content Form: Concrete
Process: Observing
Teacher: Nancy Conrado

Topic: Language Development: Candle Holder, Candle, Flashlight
Content Form: Concrete
Sequence: Observing, Noticing Differences, Concept Testing
Teacher: Mary Ostoich, Sue Anderson, Mindy Shriver

Topic: Language Development: Family
Content Form: Representational
Sequence: Observing, Recalling
Teacher: Carolyn Forrest

Topic: Language Development: Pillows
Content Form: Concrete
Process: Observing, Noticing Differences, Noticing Similarities
Teacher: Ann Horner

Topic: Language Development: School Supplies
Content Form: Concrete
Process: Concept Labeling
Teacher: Marilyn Massey

Topic: Language Development: Transportation
Content Form: Representational
Process: Grouping
Teacher: Carole DePaola

Topic: Language Development: Glass Tumbler
Content Form: Concrete
Process: Concept Testing
Teacher: Carole DePaola

Topic: Language Development: Boys Eating
Content Form: Representational
Process: Noticing Similarities
Teacher: Carole DePaola

Topic: Language Development: Scissors, Paper Punch
Content Form: Concrete
Process: Noticing Differences
Teacher: Carole DePaola

Topic: Language Development: Brushes
Content Form: Concrete
Sequence: Observing, Noticing Differences, Noticing Similarities, Concluding, Generalizing, Concept Testing
Teacher: Carole DePaola

Topic: Language Development: Describe Blank Card
Content Form: Concrete
Process: Observing
Teacher: Ann Horner

Topic: Language Development: Book Jacket Description
Content Form: Concrete
Process: Observing
Teacher: Ann Horner

Topic: Language Development: Cork, Magnet, Wood, Sponge
Content Form: Concrete
Process: Observing
Teacher: Nancy Conrado

Topic: Language Development: Office Supplies
Content Form: Concrete
Sequence: Observing, Grouping, Concept Labeling
Teacher: Marilyn Massey

Topic: Language Development: Stove, Refrigerator
Content Form: Symbolic
Sequence: Recalling, Noticing Similarities
Teacher: Nancy Conrado

Topic: Language Development: Ball, Fork, Scissors
Content Form: Concrete
Process: Noticing Differences
Teacher: Lucy Savon

Topic: Language Development: An Apple
Content Form: Concrete
Process: Concept Testing
Teacher: Rita Bendinelli

Topic: Language Development: The Apple
Content Form: Concrete
Process: Concept Testing
Teacher: Mindy Shriver

Topic: Language Development: Football, Baseball, Golf
Content Form: Symbolic
Process Noticing Similarities
Teacher: Rita Bendinelli

Topic: Language Development: School Supplies
Content Form: Concrete
Sequence: Grouping, Concept Labeling, Classifying
Teacher: Mary Ostoich

Topic: Language Development: Attribute Blocks
Content Form: Concrete
Process: Noticing Differences
Teacher: Mary Ostoich

Topic: Language Development: Grasshopper Race
Content Form: Concrete
Process: Recalling
Teacher: Mary Ostoich

Topic: Language Development: Christmas Tree
Content Form: Representational
Process: Concept Testing
Teacher: Mary Ostoich

Topic: Language Development: Sewing Materials
Content Form: Concrete
Process: Observing
Teacher: Mary Ostoich

Following is listed a series of topics for Observing lessons written for language development at the representational level. All lessons were written by Ann Horner.

Brush
Flowers
Food
Sonny and Cher
Bath
Ship
Letter
Man
Grandmother
Girl
Screw Driver
Hammer
Water Hose
Rake
Sweeper
Putty Knife
Garbage Truck
Mail Truck
Step Ladder
Ladder, Hammer, Ironing Board
Cash Register
Electric Lawn Mower

Research Skills

Topic: Research Skills: Outlining--Note Taking
Content Form: Representational
Sequence: Recalling, Grouping, Labeling
Teacher: Lyn Taylor

Topic: Research Skill: Using the Dictionary
Content Form: Representational
Sequence: Observing, Recalling
Teacher: Susan Baker

Word Analysis

Topic: Word Analysis: Spelling
Content Form: Symbolic
Sequence: Grouping, Concept Labeling
Teacher: Barbara McClure

Topic: Similar Words
Content Form: Symbolic
Process: Observing
Teacher: Marilyn Massey

Topic: Vowel Rules (VCV, VCCV)
Content Form: Representational
Sequence: Observing, Noticing Differences, Noticing Similarities, Classifying, Anticipating
Teacher: Susan Baker

Topic: Rhyming Words
Content Form: Concrete
Sequence: Observing, Noticing Differences, Noticing Similarities, Concluding, Concept Labeling//Observing, Noticing Differences, Noticing Similarities, Concept Testing
Teacher: Rita Bendinelli

Topic: Basic Vocabulary
Content Form: Symbolic
Process: Observing
Teacher: Marilyn Massey

Topic: Alphabetical Order
Content Form: Symbolic
Process: Ordering
Teacher: Marilyn Massey

Topic: Letter Substitution
Content Form: Symbolic
Process: Concept Testing
Teacher: Carolyn Forrest

Poetry

Topic: Poems
Content Form: Symbolic
Sequence: Recalling, Noticing Differences, Noticing Similarities, Classifying, Concept Testing
Teacher: Lyn Taylor

Topic: Poem--Story
Content Form: Symbolic
Process: Noticing Differences
Teacher: Lyn Taylor

Literature--Critical Analysis

Topic: Illustrations--Media
Content Form: Representational
Process: Observing
Teacher: Susan Baker

Topic: Observing Illustrations--The Christmas Whale
Content Form: Representational
Process: Observing
Teacher: Susan Baker

Topic: Two Versions--London Bridge Is Falling Down
Content Form: Symbolic
Sequence: Recalling, Noticing Similarities, Noticing Differences
Teacher: Darrel Timmons, Barbara McClure

Topic: Comparing Media of Illustrations
Content Form: Representational
Sequence: Observing, Noticing Differences, Noticing Similarities, Making Choices
Teacher: Darrel Timmons

Topic: Two Versions--Androcles and the Lion
Content Form: Representational
Sequence: Observing, Recalling, Observing, Recalling, Noticing Differences
Teacher: Barbara McClure

Topic: The Hating Book by Charlotte Zolotow
Content Form: Symbolic
Sequence: Recalling, Inferring Feelings, Inferring Causes, Concept Labeling
Teacher: Nancy Hurd

Topic: Whistle for Willie, Peter's Chair by Keats
Content Form: Symbolic
Sequence: Recalling, Noticing Differences, Noticing Similarities
Teacher: Nancy Conrado

Topic: The Greyhound
Content Form: Symbolic
Sequence: Recalling, Inferring Feelings
Teacher: Darrel Timmons

Topic: Sam, Bangs, and Moonshine by Ness
Content Form: Representational, Symbolic
Sequence: Inferring Causes, Inferring Effects
Teacher: Lyn Taylor

Topic: T is for Tommy and Tale of a Black Cat
Content Form: Representational
Sequence: Observing, Noticing Similarities, Noticing Differences
Teacher: Marilyn Massey

Topic: Books by Charlotte Zolotow
Content Form: Representational
Sequence: Recalling, Concept Labeling, Inferring Feelings
Teacher: Nancy Hurd

Topic: Peter's Chair, Baby Sister for Frances compared
Content Form: Representational
Sequence: Noticing Differences, Noticing Similarities
Teacher: Susan Baker

Topic: Lentil and Blueberries for Sal by R. McCloskey Compared
Content Form: Representational
Sequence: Recalling, Noticing Differences, Noticing Similarities, Inferring Feelings
Teacher: Nancy Hurd

Topic: Whistle for Willie
Content Form: Symbolic
Process: Recalling
Teacher: Nancy Conrado

Topic: Bread and Jam for Frances and Cheese, Peas, and Chocolate Pudding
Content Form: Symbolic
Sequence: Recalling, Recalling, Noticing Similarities
Teacher: Marilyn Massey

Topic: Alexander and the Wind-up Mouse by Leo Lionni
Content Form: Symbolic
Process: Recalling
Teacher: Brenda Steinhoff

Topic: "The Mountain Trolls" and "The Forest Trolls" from Norwegian Fairy Tales by Strindberg
Content Form: Symbolic
Sequence: Recalling, Recalling, Noticing Differences, Concluding, Noticing Similarities, Concluding
Teacher: Darrel Timmons

Topic: Any Book
Content Form: Symbolic
Process: Recalling
Teacher: Darrel Timmons

Reading

Topic: Scott Foresman Reading Systems Study Book 5, Page 9
Content Form: Representational
Process: Observing
Teacher: Sue Anderson

Topic: Observing Pictures in Books
Content Form: Representational
Process: Observing
Teacher: Marilyn Massey

Topic: Story of Babar
Content Form: Symbolic
Process: Recalling
Teacher: Nancy Hurd

Topic: Scott Foresman Systems Level 13, pp. 2-14 "Be Nice to Josephine"
Content Form: Symbolic
Sequence: Recalling, Ordering, Concept Testing, Inferring Causes, Concluding, Generalizing, Anticipating
Teacher: Shirley Abbey

Kinds of Books

Topic: Appropriate Resources
Content Form: Concrete
Process: Making Choices
Teacher: Joan Hines

Topic: Books in the I. M. C.
Content Form: Concrete
Sequence: Observing, Noticing Differences, Grouping, Concept Labeling, Concept Testing, Concluding, Making Choices
Teacher: Joan Hines

SOCIAL STUDIES

Miscellaneous

Topic: Magicians (Careers Unit)
Content Form: Symbolic
Sequence: Recalling, Grouping, Concept Labeling//Questioning, Grouping, Concept Labeling
Teacher: Lyn Taylor

Topic: Restaurant (Careers Unit)
Content Form: Concrete, Symbolic
Sequences: (Recalling, Questioning); (Observing, Noticing Differences, Noticing Similarities, Concluding, Inferring Causes, Concluding); (Grouping, Concept Labeling, Classifying); (Inferring Effects, Concluding, Concept Testing); (Recalling)
Teacher: Brenda Steinhoff

Topic: Stocks (Careers Unit)
Content Form: Symbolic
Process: A series of five Recalling lessons from pamphlet materials
Teacher: Shirley Abbey

Topic: Stocks (Careers Unit)
Content Form: Symbolic
Process: Questioning
Teacher: Shirley Abbey

Topic: The Olympics
Content Form: Symbolic
Process: Questioning
Teacher: Barbara McClure

Topic: Play is Universal among Children but it Takes Different Forms in Different Places
Content Form: Representational
Sequence: Observing, Noticing Differences, Noticing Similarities, Concept Labeling, Classifying//Noticing Similarities, Noticing Differences, Concluding, Generalizing, Anticipating
Teacher: Rita Bandinelli

Topic: Norwegian Fisherman (wood carving)
Content Form: Concrete
Process: Observing
Teacher: Nancy Hurd

Topic: Clothing
Content Form: Representational
Process: Grouping
Teacher: Marilyn Massey

Topic: American Indians (culmination)
Content Form: Symbolic
Sequence: Recalling, Noticing Differences, Noticing Similarities
Teacher: Nancy Conrado

Topic: United States Map (Hawaii, Ohio, California, Texas, Alaska)
Content Form: Representational
Sequence: Observing, Noticing Differences, Noticing Similarities
Teacher: Barbara McClure

Topic: United States Map
Content Form: Representational
Sequence: Observing, Grouping, Concept Labeling, Ordering
Teacher: Barbara McClure

Topic: Model City
Content Form: Representational
Process: Recalling
Teacher: Marilyn Massey

Topic: Model Airport
Content Form: Representational
Sequence: Observing, Recalling
Teacher: Marilyn Massey

Topic: An Airport
Content Form: Concrete
Sequence: Observing, Concluding, Concept Testing
Teacher: Nancy Hurd

Newspaper

Topic: Newspaper Advertisements (Careers Unit)
Content Form: Concrete
Sequence: Observing, Concluding, Concept Testing
Teacher: Nancy Hurd

Topic: Newspaper--Field Trip (Careers Unit)
Content Form: Concrete
Process: Recalling
Teacher: Nancy Hurd

Topic: Newspaper--People Read the Newspaper Based upon their Interests and Needs
Content Form: Symbolic
Sequence I: Recalling, Grouping, Concept Labeling, Clas ag, Inferring Causes, Concluding, Generalizing aking Choices
Sequence II: Recalling, Noticing Differences, Noticing S milarities, Concluding, Inferring Causes, Concluding, Generalizing, Anticipating
Process I: Observing a newspaper
Process II: Recalling observation of family reading newspaper
Teacher: Nancy Conrado

Community Helpers

Topic: Teachers
Content Form: Concrete
Process: Anticipating
Teacher: Carole DePaola

Topic: School Principal
Content Form: Representational
Process: Questioning
Teacher: Nancy Hurd, Carole DePaola

Topic: Dentist, Doctor
Content Form: Representational
Process: Generalizing
Teacher: Nancy Hurd

Topic: Fireman
Content Form: Symbolic
Process: Questioning
Teacher: Ann Carroll

Topic: Workers in Dental Office (Careers Unit)
Content Form: Symbolic
Sequence: Recalling, Grouping, Concept Labeling, Concept Testing, Inferring Causes, Concluding, Generalizing, Making Choices
Teacher: Sue Anderson

Topic: The Post Office (Careers Unit)
Content Form: Symbolic
Sequence: Recalling, Concept Testing, Questioning
Teacher: Nancy Conrado

Topic: The Post Office (Careers Unit)
Content Form: Representational
Process: Questioning
Teacher: Mary Ostoich

Topic: The Post Office (Careers Unit)
Content Form: Concrete
Process: 1. Questioning; 2. Concept Testing
Teacher: Marilyn Massey

Topic: Hospital Workers (Careers Unit)
Content Form: Representational
Process: Questioning
Teacher: Barbara Burkhart

Topic: Grocery Store (Careers Unit)
Content Form: Symbolic
Process: Anticipating
Teacher: Barbara Burkhart

Topic: The Farm (Careers Unit)
Content Form: Concrete
Process: Recalling
Teacher: Marilyn Massey

Topic: The Farm (Careers Unit)
Content Form: Symbolic
Process: Recalling
Teacher: Marilyn Massey

Factory (Careers Unit)

Topic: Work Done by People in Factory
Content Form: Concrete
Sequence: Questioning, Anticipating//Recalling
Teacher: Darrel Timmons, Barbara McClure

Topic: Production
Content Form: Representational
Sequence: Observing, Ordering
Teacher: Barbara McClure, Darrel Timmons

Topic: Factories (Pictures)
Content Form: Representational
Sequence: Observing, Grouping
Teacher: Barbara McClure, Darrel Timmons

Topic: Assembly Line
Content Form: Representational
Sequence: Observing, Inferring Causes, Concluding
Teacher: Barbara McClure, Darrel Timmons

Topic: One Product Produced
Content Form: Representational
Sequence: Observing, Ordering
Teacher: Darrel Timmons, Barbara McClure

Shopping Center (Careers Unit)

Topic: Effects of a Shopping Center
Content Form: Symbolic
Sequence: Inferring Effects, Concluding, Generalizing
Teacher: Shirley Abbey

Topic: A Grocery--A Dime Store
Content Form: Symbolic
Sequence: Noticing Differences, Noticing Similarities
Teacher: Shirley Abbey

Topic: Job of a Clerk
Content Form: Symbolic
Process: Questioning
Teacher: Lyn Taylor

Topic: Job of a Manager
Content Form: Symbolic
Process: Questioning
Teacher: Lyn Taylor

Topic: Job of a Policeman
Content Form: Symbolic
Process: Questioning
Teacher: Lyn Taylor

Topic: Details of Shopping Center and its Workers
Content Form: Symbolic
Sequence: Recalling, Questioning//Recalling, Noticing Differences
Teacher: Barbara McClure, Darrel Timmons

Topic: Workers with Different Skills tend to be Required where Shopping Centers are Located
Content Form: Symbolic
Sequence: 1. Cafeteria--Recalling, Inferring Causes, Concluding;
2. Department Store--Recalling, Inferring Causes, Concluding;
3. Jewelry Store--Recalling, Inferring Causes, Concluding;
Noticing Differences, Inferring Causes, Concluding, Generalizing, Making Choices
Teacher: Inservice Specialists

Topic: Differences among Shopping Center Workers
Content Form: Symbolic
Sequence: Recalling, Grouping, Concept Labeling, Inferring Causes, Concluding//Noticing Differences, Generalizing, Making Choices, Concept Testing
Teacher: Shirley Abbey, Lyn Taylor

Holidays

Topic: Thanksgiving--Indian
Content Form: Representational
Process: Observing
Teacher: Marilyn Massey

Topic: Thanksgiving--Pilgrim
Content Form: Representational
Process: Observing
Teacher: Marilyn Massey

Topic: Thanksgiving--Pilgrim's Lives
Content Form: Symbolic
Process: Questioning
Teacher: Marilyn Massey

Topic: Thanksgiving Dinner
Content Form: Concrete
Process: Recalling
Teacher: Marilyn Massey

Topic: Easter
Content Form: Symbolic
Sequence: Recalling, Grouping, Concept Labeling, Concept Testing// Noticing Differences, Noticing Similarities//Inferring Causes, Concluding, Inferring Effects, Concluding, Making Choices
Teacher: Brenda Steinhoff

Living and Working at School

Topic: Interest Centers
Content Form: Symbolic
Process: Inferring Causes
Teacher: Nancy Hurd

Topic: Care of LP Records
Content Form: Concrete
Process: Anticipating
Teacher: Mindy Shriver

Topic: Care of Classroom
Content Form: Symbolic
Sequence: Inferring Causes, Concluding
Teacher: Mary Ostoich

Topic: Care of Classroom
Content Form: Symbolic
Process: Inferring Causes
Teacher: Mindy Shriver

Topic: Care of Books
Content Form: Concrete
Sequence: Observing, Noticing Differences, Inferring Causes, Questioning
Teacher: Mindy Shriver

Topic: Rules
Content Form: Concrete
Process: Inferring Effects
Teacher: Barbara Burkhart

Topic: Gym Rules
Content Form: Symbolic
Process: Recalling
Teacher: Marilyn Massey

Topic: Why Teachers?
Content Form: Concrete
Sequence: Anticipating
Teacher: Mary Ostoich

Feelings, Attitudes, Values, Human Behavior

Topic: People in Action
Content Form: Representational
Sequence: Observing, Inferring Feelings
Teacher: Barbara McClure

Topic: "The Joy of Being You"
Content Form: Representational
Sequence: Observing, Inferring Feelings, Inferring Causes
Teacher: Darrel Timmons

Topic: Fear of Storms
Content Form: Representational
Process: Inferring Causes
Teacher: Carole DePaola

Topic: Loneliness
Content Form: Representational
Process: Nancy Hurd

Topic: Feelings About Recess
Content Form: Symbolic
Process: Inferring Feelings
Teacher: Barbara McClure

Topic: Feelings of Teachers
Content Form: Symbolic
Process: Inferring Feelings
Teacher: Nancy Hurd

Topic: Feelings of Characters in "The Box"
Content Form: Symbolic
Process: Inferring Feelings
Teacher: Mary Ostoich

Topic: Guilt
Content Form: Symbolic
Sequence: Recalling, Inferring Feelings, Inferring Effects
Teacher: Darrel Timmons

Topic: Observing People--Questionnaire, Interview
Content Form: Representational
Sequence: Observing, Noticing Differences, Noticing Similarities
Teacher: Nancy Conrado

Topic: Similarities Among Children
Content Form: Concrete
Process: Noticing Similarities
Teacher: Rita Bendinelli

Topic: Differences Among Children
Content Form: Representational
Process: Noticing Differences
Teacher: Rita Bendinelli

Topic: Adults--Children
Content Form: Symbolic
Sequence: Noticing Differences, Noticing Similarities
Teacher: Sue Anderson

Topic: Boy--Girl
Content Form: Concrete
Sequence: Observing, Noticing Differences, Noticing Similarities
Teacher: Ann Carroll

Topic: People (Similarities and Differences)
Content Form: Representational
Process: Concluding
Teacher: Nancy Hurd

Topic: Black Americans
Content Form: Representational
Process: Recalling
Teacher: Marilyn Massey

ART

Topic: Care of Art Center
Content Form: Concrete
Process: Inferring Effects
Teacher: Diann Hollett

Topic: Art Pictures of Yarn, Material, Felt
Content Form: Representational
Process: Observing
Teacher: Ann Horner

Topic: Hall of the Mountain King
Content Form: Representational
Process: Observing
Teacher: Ann Horner

Topic: Burlap Design
Content Form: Concrete
Process: Observing
Teacher: Ann Horner

Topic: Monster Pictures
Content Form: Representational
Sequence: Noticing Similarities, Noticing Differences
Teacher: Diann Hollett

Topic: Painting a Picture
Content Form: Concrete
Process: Making Choices
Teacher: Carole DePaola

Topic: Framing and Mounting
Content Form: Concrete
Sequence: Observing, Noticing Differences, Noticing Similarities, Concluding, Grouping, Concept Labeling
Teacher: Nancy Conrado

Topic: Witches
Content Form: Representational
Sequence: Noticing Differences, Noticing Similarities
Teacher: Sue Anderson